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EDITORIAL NOTES.

The Amazing Report on "Financial Hardships."

THE report has been issued of the Committee appointed to consider the question of financial relief, in respect of gas prices and dividends, to gas undertakings whose capital is suffering severely owing to circumstances produced by the war; and it must at once be emphatically said that it is a peculiar and amazing document. With the utmost candour, the Committee admit that the case for relief has been fully proved, and that relief ought to be given; but their estimate of the relief that should be granted, and the form it should take, are (to put it mildly) grotesque in the circumstances of the times, when the Government are paying 5 p.ct. for loans and bonds, supplemented by their security for repayment. As a matter of fact, what the Committee recommend is no relief at all for (so far as we can see) any one of the twenty-four undertakings that have been before them. They have to reach a still worse position than that to which they have descended and grappled with before asking any assistance whatever of Parliament. Virtually, notwithstanding the acknowledgment of the Committee that the gas companies proved their case, the recommendations are a victory for the opponents; and we should imagine that, when the report comes to be discussed by the House, not even those hostile to relief will take exception to the recommendations. It will thus only remain to those who see the injustice of them to protest, and appeal to the House for their amendment on the ground of inadequacy, in view of the findings of the Committee. The findings, we must say, suggest that in the first place the Committee intended to give more than in the event they have done; and the fact that the members met five times before reaching final agreement rather supports the idea of a gradual recession from the original intention in order to present to the House a unanimous report. The recommendations are patently a compromise to harmonize divergent views. Before leaving this point, mention may now be made of a matter that we have refrained from referring to before. It is that on the Committee there were two members of the London County Council; and the Council were present before this tribunal as opponents. We place this on record without comment, because comment would be superfluous.

Let us now examine the findings. The Committee early in their report (which is reproduced in this issue) admit that, when the sliding-scale prices and dividends and maximum prices were determined, no one could possibly have foreseen that such abnormal conditions as those under which the gas industry is now operating would come to pass, nor the effects that such a war as this would have upon undertakings of this nature. They also realize that the causes which have produced the present position for gas undertakings are being felt in an increasing degree, and will probably continue to so increase the longer the war lasts. The causes are found in the prices and supplies of coal, oil, labour, goods generally, in restrictions, and in the Government control of the secondary products. So far good. But more that is better follows; and it fully vindicates the appeal that has been made to Parliament for justice to gas capital. The Committee proceed to express themselves as being completely satisfied that some temporary modification of the statutory requirements is expedient in some cases; but they have found—this was expected—it to be extremely difficult (if not impossible) to lay down one general rule affecting prices and dividends which would be equitable to all companies alike. In the next place, the Committee declare that they have realized the "importance" of adjusting any "additional" cost in supplying gas upon such a basis as will be "fair and equitable to both consumer and "shareholder." The word "additional" refers to those costs that have been occasioned by the war. Having thus realized the "importance" of the additional cost being shared "fairly and equitably" between the consumer and the shareholder, one would have imagined that the Committee would at any rate have left alone the standard dividend which Parliament had conceded as a fair (though low) starting-point for normal times—not abnormal and unexpected times such as these—and would have given the shareholders, if not 80 p.ct., at any rate half, or 50 per cent. of the increase of dividend which they had earned in normal times above the standard rate. That some such plan would (in view of the difficulties of dealing-out equity to all companies alike) have shown a better appreciation of what is fair and equitable than the actual recommendations of the Committee, is fully accentuated by their recognition that, while a large number of consumers are people of limited means, to whom any increase in price is a matter of serious consideration, the capital of most of the gas companies is distributed in small amounts among a large number of persons also of limited means, and in some cases among the workpeople, to both of which classes the falling-off of dividend is a matter of serious importance. The reduction of income from invested savings is a matter of gravity to very many in these days of high prices for commodities and other heavier financial obligations; but the recognition of this serious consideration has but dull and ill-defined reflection in the recommendations. Then we have the statement that the Committee have unanimously come to the conclusion that some provision should be made for the temporary modification of statutory requirements in regard to price and dividend in the case of those gas undertakings whose financial circumstances have been so seriously affected as to call for intervention.

All this is good; and, as we say, there is every justification shown in it for the appeal to Parliament, and every justification for recommendations befitting the findings. This, however, is where the Committee lamentably fail. In one part of the report, they—alluding to the rise and fall of dividend under the sliding-scale—quote the description at one time applied to the system by the Right Hon. W. E. Forster: "It was a fine if they charged a high price; and "a reward if they charged a low one." This remark was made in reference to the operation of the sliding-scale under normal circumstances. Now the Committee's recommendations in effect agree that abnormal war conditions, over which gas administrators have had no control whatever, should inflict a very heavy fine upon gas capital, until only the shadow of a dividend remains to the holders, and then (and not till then) a halt may be called. We cannot see the logic of this. The Committee's whole argument declares that gas capital should receive a fair return under the current extraordinary circumstances; but they carefully ensure that a fair return shall not be realized. The very first recommendation lays it down as a fundamental condition that, "in the public interest, the stability of gas under-"takings" should be maintained. They propose to maintain the stability in what we can only regard as a ludicrous fashion, of which those members who had greatest weight in shaping the findings must feel heartily ashamed. Their plan is that, in the case of any company operating under the sliding-scale or the maximum price systems whose dividend has been reduced to one-half of the standard or maximum rate, or to one-half of the average dividend calculated on the three financial years immediately preceding the war (whichever may be the smaller), the sliding-scale or maximum price

shall cease to operate, and the company shall be entitled to charge such price for gas as may be held by the Board of Trade to be sufficient to pay outgoings and the modest dividend as stated above.

How on earth this plan is going to maintain, in the public interest, the stability of gas undertakings, we entirely fail to see. The standard rate is in the case of a considerable amount of ordinary capital only 4 p.ct.; so that all the relief the Committee suggest should be legislated for is the maintenance of a 2 p.ct. dividend. And, be it remembered, this is on par value—not on the investment or the amount originally paid for the stock. Therefore, on the investment the dividend in respect of much of the capital would only be between 1 and 2 p.ct.—next door to complete extinction. The second clause of the recommendation, so far as sliding-scale companies are concerned, with the provision in it "whichever "may be the smaller," is a redundancy, seeing that less than 2 p.ct. would be a feeble prop with which to maintain the stability of a gas undertaking. Nor can we see that the alternative would be of any value in the case of maximum dividend companies, inasmuch as before the war the worst of them were doing much better than they are now. So that the qualification "whichever may be the smaller" entirely destroys any value there might be in the alternative. In fact, the words of the alternative are wasted, and so are the paper on, and the ink with, which they are printed. On the point of doing what is equitable between the consumer and the shareholder, the war has greatly increased the responsibility, anxiety, and difficulties of gas companies in maintaining the service. Nevertheless the Committee are of opinion that the dividend may fall to (say) 1¾ or 2 p.ct. on the nominal value of the ordinary stock or shares, and remain at that. In this, evidence of equity is not apparent; and we venture to think that, if members of the Committee are interested in any other form of industrial enterprise, they would not themselves regard such a return as equitable, especially if they paid, as most gas share and stock holders have done, a premium for their shares or stock—and (in the case of gas) a very heavy one—for unconverted and maximum price capital. But for inconsistency, commend us to the third recommendation, which deals with local authority undertakings. In their case, it is proposed that they shall be entitled to increase the charge for gas beyond the statutory maximum rate to such an extent as may be necessary to pay the actual cost of manufacture and distribution, but the increase is in no case to exceed "one-half the statutory "price" fixed for the undertaking. This means that if the maximum price of gas is 4s. 6d., it may be advanced to 6s. 9d.! Yet all that was asked for was an additional 6d. on the maximum figure! But the Committee had better have a care. There are municipalities who have put up the price beyond what is necessary to pay the expenses of manufacture and distribution, solely in order to obtain money to go in relief of the rates—this in excess of their requirements for financial purposes directly relating to the concern.

There are other proposals—such as that the recommendations should be carried into effect by general legislation, and not by Private Bills, and that companies should be enabled to make application direct to the Board of Trade. As to the period during which the strange scheme of so-called "relief" shall have effect, it is contemplated that it shall extend to one year after the war, or such further time as the Board of Trade may by Provisional Order (subject to confimation by Parliament) determine.

To say that we are disappointed with the recommendations—which disappointment will be shared by the whole industry—is a mild expression of our feelings. In view of the findings of the Committee, we can only regard the recommendations as a travesty of justice. We repeat that there is no relief, so far as we can see, for any one of the twenty-four promoting companies, who, on the Committee's own showing, proved the case for relief. Apart from the injustice that has been done to gas capital until it is utterly *in extremis*, what is likely to happen outside? The Committee call what they offer "relief," when it is nothing of the kind. The very fact of such a misapplication of the term will spread the idea among the public that the companies are really obtaining relief; and with this idea the companies will be faced whenever (as the Committee manifestly expect will be the case) the price of gas has to be further raised. This is also going to make the position of gas undertakings extremely difficult in talking to Government Departments of "financial hardships;" for they will always now be met with the statement: "You have had "your Committee; and you have got your relief." If the matter were not so serious for the industry, the manner in which the Committee propose to maintain "in the public "interest the stability of gas undertakings" would be humorous. Only when dividends are on the verge of total extinction does a teaspoonful of relief come; but the relief must not exceed a teaspoonful. Perhaps Sir William Middlebrook and his colleagues will have an opportunity of attempting to reconcile the recommendations with the findings when the matter is under debate in the House. We sincerely hope that suitable protest will then be made against recommendations which are devoid of all sense, when regarded in the light of the findings by intelligent and unbiassed men.

Further Reflections on Lord Moulton's Call.

It is still regarded by us as an immense pity that those who have charge of the administrative and financial affairs of the gas industry were not brought long ago into a central organization—a scheme which for years has been advocated by the "Journal," but has been largely treated with silent indifference in many quarters. There is no question about it that those (speaking generally, and not of the isolated exceptions to the rule) who are placed in the position to guard the financial interests of gas undertakings and to exercise the final voice in their administrative affairs, know comparatively little about the industry. Had they known more, the industry would have been in a much stronger position to-day to meet not only necessary internal developments, but to resist those external ones which are intended to work up to the point of strong offensives against the positions and the stability of the industry. Moreover we should have had a settled policy for which to work to the end of making the industry competitively more powerful for both offensive and defensive operations in regard to the future. We have now had that keen observer the Rt. Hon. Lord Moulton among us; and, in the most courteous way possible, he has in his Presidential Address to the Institution of Gas Engineers showered upon us some plain truths. The more we read and consider the address, the more the voice is heard accusing the gas industry of having done many things which it ought not to have done, and of having left undone many things which it ought to have done. But the accusation is accompanied by a call to action. Action cannot well be taken without conviction—conviction as to the need; and the neglected work of educating the guardians of the industry's finance, and of striving to gain their stronger interest and adherence is only to begin now. But how? By printing a few hundred copies of Lord Moulton's address, and distributing them among them. That is all right so far as it goes. But how far will it go in the case of minds unprepared by an intimate knowledge of the facts? We would that the address had been delivered to the biggest audience that could have been brought together of the administrators of the industry who—by association in a central organization, and by prior discussions of matters relating to gas policy and the industry's requirements—had been fully prepared for the stimulating words of the address, with behind those words all the force that the author of the composition is alone capable of putting into it. The effect would have been valuably vivifying; and such an effect is badly wanted in the gas industry to-day.

The industry claims to be progressive. It is in some respects, but not in all. And the respects in which it is not are of vital importance. The one which we have instanced is so. Of the power of organization, the industry has never made the fullest use up to now. There has been piecemeal work. There has always been the fear of something or other happening. There has been jealousy; and to this there has been a subordination of the largest interests of the industry. There has always been the obstacle of the technical men wanting to continue to be "top-dogs," while knowing that the power of veto remained in the hands of the superior administrative bodies without, through keeping them disunited, the knowledge which enables exact and right determination. Nothing could strip the technical men of their position; but an appreciative administrative body—one understanding the necessities of the industry—would unquestionably give to the professional organization more scope for its legitimate work, and so would enable it to add lustre and recognition to its standing, both of which unfortunately are conspicuously absent to-day. The industry is now reaping the reward of past neglect. The address

of Lord Moulton indirectly asserts it. The industry will have to meet the full force of competitive attacks on its front and flanks in the rapidly approaching future. The address of Lord Moulton clearly shows it. Does the gas industry—administrators and technical and other officers—fully realize what a big thing the gas industry is up against if the electricity industry captures the financial support of the Government, and have an *ad hoc* body of highly paid and highly qualified Commissioners to legislate for it—no matter how chimerical may appear to be the reorganization schemes launched on paper? We fear not. Do they realize that it is necessary to so order the manufacture of gas that the needs of industry and domestic life are supplied with gaseous fuel at the lowest possible cost? Not all of them. Do they realize that reasonable concentration of production is an aid to economy, and that distribution arteries must be extended so as to extirpate uneconomical gas-producing stations? We fear not. Do they realize the intensive and cumulative competition that will assail the industry's various secondary products after the war? We think not.

It was time we had an address such as that of Lord Moulton. As he showed, our assets are of a fine order. How long they will be so depends on the raising of the standard of the industry's leadership. The industry stands charged with having been negligent in the past, of having failed to make the best use of its opportunities, of having evinced a disinclination to disturb the stereotyped conditions under which it pursues its service. Is it still going along in the same old way? Or is it intending to make its conditions fit the time of day? Upon the decision rests the promotion of success in face of the new competitive conditions, or the promotion of decline, the rapidity of which will depend upon the two factors of internal inactivity and external activity.

Reviewing the Position.

THERE is one subject which the occupants of presidential chairs in the gas industry in these trying days appear never to tire of discussing, and simply because it is one of daily and hourly presence, and from it, in all the doings and dealings of a gas undertaking, escape is impossible. It is composed of the multiplex difficulties which the war has produced, and which have come upon the industry with an unkind violence, and have helped to cause an unpleasant financial decline. We know of no other industry that has been sweated so much as the gas industry financially and materially, nor one which has received so little sympathy. The matter was dealt with by Mr. John Richmond, of Penicuik, in his address to the Waverley Association last Thursday; and there is interest in the comments from an observant mind of one across the Border. In practically all respects, we are in the same boat with our Scottish friends. Finance, coal, and labour are causes of worry and effects quite consistent with those southwards. When we come to secondary products, it cannot be said that those who purchase tar and ammoniacal liquor have, in every quarter, been fairly treating the producers. The Government have been ready enough to make good use of certain of the products of gas manufacture and to control prices; but they have not taken any steps to compel buyers of crude materials to pay better prices for certain of them, notwithstanding higher intrinsic value in some respects.

It is something, however, to find Mr. Richmond able to say that he has recently observed a tendency among the distillers to become more considerate in their dealings. This may be due more to misgivings as to future developments than to any awakening of a spirit of generosity. As to coke, this has been a drug in the market. According to the Coal Controller, it is going to be so no longer; for he is intending to insist on its use to help to relieve the coal situation. But it is impossible to acquit the industry altogether of blame for their coke troubles. It has been shown so often that, under simply applied conditions, coke has substantial claim to use in steam-raising; and what these conditions are have been fully explained, and frequently, in our columns by various writers, including Mr. E. W. L. Nicol, the expert of the London Coke Sales Committee. Naturally, in respect of the purchase of goods, those responsible for gas undertakings feel mightily aggrieved over the prices they have to pay when they consider some of the dividends paid by manufacturing companies. They are not all of an inflated order, though in most cases they show a full-bloodedness compared with war-time distributions that gas undertakings can make, and the meagre allowance which a Committee of the House of Commons thinks is sufficient for maintaining "in the public interests" the "stability" of the industry. These wartime clouds are, however, pierced by a few sun rays, which betoken good for the future, though there will be much to be done in order to re-establish financial confidence.

The best way to do this will be through the reconstruction of the operations of the industry on lines that will make the largest possible advancement in service. And one of these lines is the gas which will be the most economical for general use. Mr. Richmond considers the problem. But he appears to have a lingering regard for even the "fat" cannel gas of yore—at any rate, he argues that there is value to the consumer in high calorific power gas, and yet he uses expressions indicating a desire not to be regarded as loitering outside the ranks of gas progressives. Mr. Richmond draws a distinction between gas "value" and "serviceableness;" while, from our way of thinking, there is no distinction. The serviceableness of gas is its value. The argument that gas of (say) 450 B.Th.U. is as efficient in practical use as (say) gas of 650 B.Th.U., he says, is undoubtedly correct. That is an admission; but the President does not consider, in the address, why the lower calorific value gas is as efficient as the higher. Then he hedges with the remark, "this does not say that gases so widely differing in thermal "value are of equal value to the consumer, although they "may be equally serviceable." We get some inkling as to what Mr. Richmond has in mind when he remarks: "1 c.ft. "of gas of 450 B.Th.U. requires about 5 c.ft. of air to "complete combustion—giving (say) 6 volumes of com-"bustible gas; whereas 1 c.ft. of 650 B.Th.U. requires "fully 7 c.ft. of air, giving 8 volumes of combustible gas. "Thus, if 450 B.Th.U. gas is sold at 3s. per 1000 c.ft., 650 "B.Th.U. gas is worth 4s., or 25 p.ct. more."

In the first place, 650 B.Th.U. gas is expensive to make; and it is very doubtful whether there are many places in which it could be sold at only 1s. per 1000 c.ft. more than the 450 B.Th.U. gas. In the second place, even assuming it could be sold at an additional 1s., would the 8 volumes of gas (650 B.Th.U.) and air mixture be as valuable as the 6 volumes of gas (450 B.Th.U.) and air? We are doubtful. Every cubic foot of air that is required by the gas to effect complete combustion has within it 78 p.ct. of nitrogen; and the more nitrogen passing in with a cubic foot of gas, the greater the deterioration of the flame and its temperature, and the greater the quantity of heat-absorbing products of combustion. Moreover, one can never with ordinary gas appliances effect such a complete admixture of the gas and air with gas of such high calorific power as one of the lower power, which again depreciates useful value. There has in the past been, through ignorance, as much deception of the consumers as to the values of high calorific and illuminating power gas, as Mr. Richmond apparently imagines there is in regard to this question of the supplying of a lower calorific power gas. It does not follow (within the limit to which town gas is likely to be allowed to descend in the matter of calorific power) that inert gases need be in serious proportion; for the probability is that the process of the future, if gas is allowed to go below the present standard, will be dilution with a combustible gas, which, being well made, would reduce and not increase the quantity of incombustibles in the gas. We do not think that Mr. Richmond need trouble himself as to the selling price of gas being compulsorily brought down in correspondence with the thermal value. Commercial and competitive considerations will in this respect fully safeguard consumers, subject to the dominion of manufacturing costs. We are glad to see that Mr. Richmond is opposed to the sale to consumers of gas containing a large quantity of inert gases, though he is not opposed to the sale of a gas that needs the introduction of a larger volume of inert gases through requiring more air to effect complete combustion than gas of lower calorific power.

The address deals with many other subjects of interest, among them with the centralization and amalgamation of gas undertakings—a line of policy which has been consistently advocated by the "JOURNAL" over a considerable number of years, as a means to more general economy, and through the economy the greater popularization of gas.

Professor Armstrong Speaks Again.

THAT clever chemist and idealist, and (in one thing in which we are concerned) practical failure, Professor H. E. Armstrong, has burst out in a fresh place. An article by him

has found its way into the columns of the "Financier"—the paper which was recently booming Coalite for all and more than it is worth. And we rather suspect the Professor's effort is part and parcel of the same publicity campaign. However, the article from the gas industry's point of view is not quite so intemperate as have been some of the professorial utterances regarding the gas industry. Still there is just the old touch about it; and, as a monitor of the gas industry, Professor Armstrong maintains his right to a place on an intellectual pedestal higher than that occupied by the whole of the men advising and guiding the gas industry. Of course, he cannot avoid acknowledging that the high-temperature system of carbonization produces much that is required by the dye industry and for motor car use; though it has apparently temporarily, if conveniently, escaped his memory while writing that high-temperature carbonization is serving national and war requirements to-day in a manifold way which cannot be claimed by low-temperature carbonization. It is deplorable that one who sets out to teach men, and has such a high estimate of his own attributes as an upright and competent judge, should be so behind contemporary knowledge as to libel, as the Professor again does in this article, a body of professional men. But Professor Armstrong knows how to apologize as well as to traduce. Perhaps when his information is brought up to date, he will apologize. He is evidently still out to do service under the banner of low-temperature carbonization, and to champion the supply of a coke which he acknowledges suffers from bulk and brittleness, with an indirect admission that it retains in it a good portion of volatile matter which is required for the production of the very commodities that he regards, and which are, so highly useful.

The utter abandonment of the Professor to the saying of nasty things without a complete understanding of the present-day position in regard to carbonization in gas-works is attested by the following sample passages: "The gas companies, too, have not merely confined themselves to methods "the very opposite of those that must be used if we are to "develop all the latent possibilities of coal, but have most "persistently set their faces against all departure from "established practice. They have been all but entirely in "the hands of men of narrow outlook—without imagination." Thanks! It is Professor Armstrong speaking—the professor who has been unable to supply a shred of evidence that financially or commercially he is right, and that the objects of his vehement condemnation are wrong. He is elated. "The gas world," he remarks, "has been led suddenly to "admit that the introduction of low-temperature methods is "inevitable." Nowhere have we seen this admission. But we have seen the allegation before; and we believe that it is one of the Coalite derivatives. The Professor apparently has not yet heard of the process of graduated temperature carbonization in continuous vertical retorts with steaming, which is a system that is one of the products of these men of so-called "narrow outlook—without imagination." He evidently knows nothing of the results of this system, and less of the commercial results attainable by it as part now of the everyday practice of certain gas undertakings, and a practice that has proved satisfactory to the Mineral Oil Production Department, without doing mentionable injury to the gas and ammonia yields. By it, the two interests are served—the Admiralty's and the gas industry's. When he comes to consider this position, if he can detach himself from the lure of low-temperature carbonization, he may perhaps appreciate there is a financial and a commercial side to this question which has not come within his consideration as a chemist. This being so, we question his right to be an adviser to the holders of gas stock. He, in his superabundant confidence in himself and his views, says that "the holders of gas stock should be led to realize that "the industry cannot be maintained on its present lines." In other words, if the gas industry does not do what Professor Armstrong thinks right, and will persist in following the counsel of those who have lived in daily contact with the technical and commercial work of the industry, then disaster. Gas stock holders are not all wiseacres and fools; there is a good deal of common sense among them, which even Professor Armstrong will fail to disturb.

Electricity Companies and the Gas "Relief" Report.

Electricity supply companies are not suffering during war time from the obligation of working under sliding-scale or maximum conditions, the same as gas companies. They have something for which to be thankful. In most cases, they can carry their charges up to 8d. per unit, and can charge that price for a minimum consumption of 20 units per quarter. Nor is there any obligation upon them to charge less per unit for purpose other than lighting, unless, of course, they are working under contracts. Therefore, they have a liberty which gas companies do not possess. Contrast this position with the recommendations of the Committee who have just been considering the application of gas companies for relief; and no trace of equity can be discovered. The contributor of "City Notes" to the "Evening Standard" realizes this. Writing on the subject of the report of the Committee, he remarks: "Electric lighting companies are, of course, differently situated; and by reason of increased charges are compensating themselves for the restricted consumption. As consumers, we naturally do not want gas companies to make money out of our troubles; but, on a point of equity, it seems unfair that they should be penalized while practically every other trade or business of public utility is either being subsidized or allowed to reap whatever benefit it may out of the war."

Members of Parliament and the Report.

The responsible officials of every gas undertaking in the country ought to take immediate steps to bring before the local members of Parliament the injustice that the report inflicts upon an industry that is suffering so intensely through the war, and one from which the Government has so extensively sought service, and obtained such large voluntary response. Now the Admiralty, the Army Council, and the Ministry of Munitions have the power to compel the service. Perhaps points presented in the editorial article published to-day, in which examination is made of the report, may supply a few hints which will persuade members of Parliament that here is an opportunity when Parliament might do something to give the industry power to improve the financial recompense of gas capital, and so to rehabilitate (if not wholly, in part) its position in that respect—a position brought about jointly by the war and the Government. When the report is under discussion in the House, it ought to be amended on the ground of the utter incongruity of the recommendations with the findings of the Committee.

The Leon Letter.

Perhaps the character of the report will be a matter of extreme gratification to Mr. A. L. Leon, the Chairman of the Public Control Committee of the London County Council, who published a letter in the Daily Press [*ante*, pp. 371, 386] at the time the Committee were considering their report, which was not creditable to a public body of any position—let alone one occupying the high rank of the London County Council. The thing that will not gratify Mr. Leon will be the criticism that his abuse in this instance of fairplay has evoked, a strong contribution to which criticism is made by Mr. Charles Carpenter, D.Sc., Chairman of the South Metropolitan Gas Company, in a letter to the "Daily Telegraph." The communication is published in our news columns to-day.

Increased Costs and Standard Dividends.

The Legislature of New South Wales—at any rate, in one respect—appears to have a more refined view than certain of our own legislators as to the right of gas capital to a fair return. There has been received the text of the Gas Amendment Act of this year applying to New South Wales; and on a later page we reproduce its central feature. It provides that, if at any time the cost of the production and distribution of gas is increased above the average cost of the year 1912, the gas company shall be entitled to have the standard price of gas increased by 1d. per 1000 c.ft. for every 1d. by which the cost of production and distribution is increased. On the other hand, provision is made for a reduction of the standard price on proof being forthcoming that the income, after meeting all outgoings, with a reasonable margin for contingencies, is in excess of the amount required to pay standard rates of dividend of 8 p.ct. on the ordinary capital and 7½ p.ct. on the preference capital. It will be remembered that this provision was referred to during the proceedings before Sir William Middlebrook's Committee; and, on behalf of one set of companies, it was suggested that the same provision should be applied to the companies here.

A Training School for Gas Appliance Castings.

The manufacturers of gas-heating appliances for domestic and industrial purposes are displaying a large liveliness on the technical side of the business. This is perfectly in sympathy with needs and with the remarkable address which the Institution of Gas Engineers had delivered to them a fortnight since by the Rt. Hon. Lord Moulton; and it shows a deep appreciation by the manufacturers of the important part that gaseous fuel is going to play in the future of this country, and that the maximum attainable efficiency will hasten progress, and maintain business. The Davis Gas-Stove Company, Ltd., have done a good part in the technical movement, by developing to a high standard their technical department at the Luton works. Now there is a fresh development, to which we give prominence solely because it is a striking innovation in the gas industry. It is the Diamond Foundry Training School. Briefly, the general object of the school is to provide boys with a thorough theoretical and practical training in all branches of iron founding. The period of training is to be four years, with a probationary period the length of which will depend upon the ability shown by the individual boy. There is a preliminary trial period, at the end of which a simple agreement with the firm is to be entered into by parents, if the boy is approved. Technical classes will have to be attended. Merit wages will be paid from time to time; and examinations will be held, and prizes awarded. The number of hours spent on the works per day during the probationary period will be seven. Other occupations are prohibited out of school and work hours; and a scheme of social welfare is under consideration. We do not know positively, but surmise that Mr. Harold Davis has had a good deal to do with the scheme, as it calls to mind the fact that, as a youth, he went through the mill in foundries both at home and on the Continent. Good and clean castings are an essential in the work of the gas industry; and the more efficiently trained the men are who make them, the better.

ORDER OF THE BRITISH EMPIRE.

JOHN WILKINSON.

THE many friends of Mr. John Wilkinson, the Nottingham Corporation Gas Engineer, will have read with gratification of his inclusion in the list published in last week's "JOURNAL" of those who have been appointed Officers of the Order of the British Empire, in recognition of valuable work in the country's interests. Through the utilization, under his direction, of the resources of the Nottingham works, much indispensable war material has been rendered available—there having been a very important development lately in connection with the plant at the Radford depôt, where mineral oil of excellent quality is being produced.

In succession to Mr. J. H. Brown, Mr. Wilkinson was appointed to Nottingham towards the end of 1911. He was previously Engineer and Manager of the Halifax Gas-Works for 8½ years, prior to which he was Works Manager at the Grimesthorpe Station of the Sheffield United Gas Company, having before that also had long experience in the profession. The record since he has had charge at Nottingham has been one of unbroken success; the development of the works including installations of Glover-West verticals at Radford, and of those of the Woodall-Duckham type at the large carbonizing station at Basford. In his first annual period of holding office at Nottingham up to March, 1912, for only a portion of which, however, he was responsible, a gross profit was made of £106,595; the amount rising in the four following years to £129,305, £131,917, £130,083, and £125,887 respectively. The profit in 1917 was £105,357, and last year £123,662; while during his tenure of the appointment the amount contributed in aid of the rates has aggregated £251,000. The reserve fund has now reached £219,337.

When extracting from the "London Gazette" the Birthday Honours noted in last week's "JOURNAL," the name of Mr. CHARLES J. GLADWELL unfortunately did not arrest attention, owing to the fact that he was described merely as Late Head of the Commercial Section, War Trade Intelligence Department. Mr. Gladwell, who has been appointed an Officer of the Order of the British Empire, is the Chief Accountant at the Head Office in London of the Imperial Continental Gas Association, whose service he entered in 1890. Shortly after the outbreak of war, we learn from Mr. R. W. Wilson (Secretary of the Association), the Board of Directors agreed to place his services at the Government's disposal; and reports have reached them at different times of the excellent work he has been doing—first in the War Trade Department, and more recently in the Ministry of Food—confirmation of which is now furnished by the distinction that has been conferred upon him.

Mr. L. F. TOOTH, who was mentioned in last week's issue as having been appointed to be a Member of the Order of the British Empire, was described in the "London Gazette" as Superintendent of the Meter Department of the Commercial Gas Company, instead of, as should have been the case, Assistant Superintendent. Mr. Tooth has during the war installed gas-furnaces and plant for the manufacture of non-ferrous metals, and has supervized for the Ministry of Munitions the melting of metals, on a large scale, in many London works.

PERSONAL.

The Senate of the University of Manchester have authorized the conferment of the degree of Doctor of Science on Mr. ERNEST WOODHOUSE SMITH, Chief Chemist to the Birmingham Corporation Gas Department.

Lieutenant-Colonel ARTHUR SMITHELLS, of the Leeds University, is included in a list of army honours awarded for home service—having been appointed Commander of the Order of St. Michael and St. George.

Second-Lieutenant NORMAN B. THOMPSON, D.L.I., the elder son of Mr. J. W. Thompson, Gas and Waterworks Manager to the Barnoldswick Urban District Council, is reported as missing since May 27. He obtained his commission after serving in the ranks and had only recently returned to France.

At the monthly meeting of the Accrington and District Gas and Water Board, on Thursday last, the Mayor (Alderman Dewhurst, J.P.), reported the indisposition of Mr. CHARLES HARRISON, the Manager of the Board. The members expressed their regret at the state of Mr. Harrison's health; and it was unanimously agreed to grant him three months' leave of absence.

Hearty congratulations to Mr. and Mrs. C. E. JONES, who last Tuesday celebrated their "golden wedding." Mr. Jones, who was formerly at Chesterfield, and has since coming to London been in practice as a Consulting Engineer, has had very many years' association with the gas profession. He is, indeed, one of our veterans; for on Oct. 25 he will be entering on his eightieth year. For nigh on half-a-century, he can look back on Presidential Addresses—though upon none which has excited his admiration to such an extent as that of Lord Moulton to the Institution of Gas Engineers. Those who were in the theatre of the Institution of Civil Engineers a fortnight ago saw Mr. Jones hale and hearty as ever; and all who know him will wish he may long remain so.

The Paisley Town Council have adopted the unanimous recommendation of their Special Committee to appoint Mr. ANTHONY S. NISBET as Gas Manager, at a salary of £500 a year, to succeed Mr. G. R. Hislop. Mr. Nisbet entered the service of the Paisley Corporation in 1893, under Mr. Hislop, and served in all grades from junior assistant, through general works foreman, chief assistant, and finally as Assistant Manager. He was associated with Mr. Hislop in all the later developments of the undertaking—the installation of electrically actuated charging-machinery, coal and coke handling plants, and sulphate of ammonia and concentrated liquor manufacture. Mr. Nisbet holds a "First-Class Honours Certificate" of the City and Guilds of London Institute in "Gas Manufacture."

OBITUARY.

The death occurred very suddenly on Friday last, in his 52nd year, of Alderman SQUIRE DEIGHTON, the Deputy-Chairman of the Bradford Corporation Gas Committee.

Mr. THOMAS GREENWOOD, the inventor of the "Hygienic" gas cooking stove, died recently at the age of 81. His home was at Halifax, where he was a noted personality because of his inventive genius.

The decease of two members of the French gas industry is briefly reported in the "Journal des Usines à Gaz"—namely, M. L. BOUTERON, the Manager of the Algiers Gas-Works, and M. P. TRITZ, the Engineer of the Central Gas Company.

The Yorkshire Junior Gas Association have arranged to visit the Huddersfield Corporation Gas-Works and the works of Messrs. W. C. Holmes & Co.

Tar for Diesel Engines.—According to the "Zeitschrift des Vereines Deutscher Ingenieure," tar, in place of tar oil, is being successfully used for Diesel engines driving rotary water-pumps. Trouble was formerly experienced by coke, &c., in the tar clogging the atomizer and needle-valve, and so damaging the seating of the exhaust-valves that they had to be changed every ten days. This difficulty was overcome by using a gravel filter. The present practice is to heat the tar to 30° or 35° C. by the circulating water, and then pass it through a bed of gravel about 400 mm. in thickness. The size of the gravel particles is from 1 to 1·5 mm. The filter is placed high up; and the tar flowing from it is heated by exhaust gases, so that it reaches the fuel pumps at 70° to 80° C. The filter operates without attention for four weeks or so; and complete combustion is obtained in the working cylinders.

THE "FINANCIAL HARDSHIPS" GAS BILLS.

REPORT OF THE SELECT COMMITTEE.

LAST Thursday the report was issued of the Select Committee appointed by the House of Commons "to consider and report whether it is expedient that some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances have been injuriously affected by causes arising out of the war, and, if so, on what terms and conditions, and whether by Private Bill or General Legislation." The members of the Committee were Sir William Middlebrook, Mr. Acland Allen, Mr. Anderson, Mr. Allen Baker, Mr. Field, Mr. Fletcher, Mr. Macmaster, Mr. Robinson, Mr. Stewart, and Captain Barnston; and their proceedings were reported in the "JOURNAL" for May 7, 14, and 21. The following is the full text of the report.

Your Committee were appointed on April 22, 1918, to consider and report whether "it is expedient that some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose circumstances have been injuriously affected by causes arising out of the war, and if so on what terms and conditions, and whether by Private Bill or general legislation."

Your Committee were given powers to hear Counsel upon matters referred to them so far as they thought fit, and power to send for persons, papers, and records.

Your Committee met on Tuesday, April 30, and held eight meetings for hearing evidence, and five subsequent meetings for considering the questions referred and their report.

Your Committee first considered their course of procedure, and decided to hear one set of Counsel and one set of witnesses on behalf of the gas undertakings (whether municipal or private companies) which are desirous of modification of their statutory terms, and also one set of Counsel and one set of witnesses as representing all opponents to any modification.

They reserved consideration of whether any other parties, either as supporters or opponents, should be entitled to appear, and subsequently decided to allow one set of Counsel and one set of witnesses to appear on behalf of a considerable number of the smaller provincial undertakings.

They further decided ultimately that it was not necessary for single companies or municipalities to be separately represented, as the Committee were satisfied that the evidence before them supplied a sufficient statement of the case.

It may be well, by way of explanation, to state that gas undertakings, so far as regards financial circumstances, are in the main divided into two classes, known as "sliding-scale companies" and "maximum dividend companies."

The sliding-scale company, by its statutory powers, has a fixed price, known as the "standard price," at which it must supply gas to consumers, and a fixed dividend, known as the "standard dividend," which may be paid by the company to its shareholders so long as it earns sufficient profit for such payment and is charging only the standard price to its consumers. Any variation in the standard price subjects the dividend to a reduction, usually 5s. per cent., on the dividend as against 1d. per 1000 c.ft. increase on the price to the consumer, and a corresponding increase above the standard rate of dividend for every penny per 1000 c.ft. reduction below the standard price to consumers.

The "standard price" and the "standard dividend" are not the same for all companies, as Parliament fixed these standards in each case when the company obtained its statutory power.

This system of the sliding-scale first came into force during the period of 1875-77, and has almost always been applied to companies seeking statutory powers subsequent to that period.

It was designed with the double object of protecting the interests of gas consumers by obtaining the supply at as low a price as possible, and at the same time to promote the careful and economical management of the system of production by giving the inducement to those in control of an increased dividend above their standard rate. In the words of the Chairman of a Select Committee of this House (Rt. Hon. W. E. Forster): "It was a fine if they charge a high price, and a reward if they charge a low one." The effect has been to bring the consumer and the producer into the one common interest of maintaining a low price of gas.

It was generally admitted that the sliding-scale system has been a great success, and that it should be maintained in the future as the general principle upon which gas undertakings are managed; and your Committee agree in this view. At the same time, it should be borne in mind that the standard price and standard dividend were fixed in each case under circumstances existing at the particular time, and no doubt with allowance for ordinary and even exceptional conditions that affect all commercial undertakings. No one, however, could possibly foresee the abnormal conditions now prevailing, and the effect which a war of the magnitude and duration of the present war would have on undertakings of this nature.

The second class of undertakings above referred to—known as "maximum dividend companies"—differ from the first-named class in that they are limited to a maximum dividend as fixed by the Statute affecting each particular company; and after paying such dividend and providing a limited reserve fund to safeguard the limited dividend, the shareholders cannot get more, however successful their trading, and the whole of the remaining profits go in reduction of price.

The special causes for the increased cost of supplying gas may be summarized under the general headings of increases in the cost of coal, oil, labour, and materials (other than coal), together with carriage by rail and freight for seaborne coal; while certain aspects of Government control have contributed to the difficulties of the gas undertakings.

The consequence upon the finances of the undertakings is found to be that in most cases the price of gas has been increased, and in some cases the dividends payable to shareholders have been decreased below the "standard dividend," and, in a few cases, extinguished. The effect of the above causes is being felt in an increasing degree, and will probably continue to so increase the longer the war lasts.

On the other hand, it has been urged that the increased prices which gas undertakings can now obtain for their residual products will compensate to a greater or less extent for the increased cost of production. But owing to the fact that producers have not a free hand in the disposal of such residuals, either as to price or customers, this result has not so far been produced, nor does it appear to your Committee that there is any likelihood of any substantial increase while war continues.

Your Committee, however, are satisfied from the evidence placed before them that some temporary modification of statutory requirements is expedient, in some cases. But the varying conditions of the different cases of gas undertakings render it extremely difficult (if not impossible) to lay down one general rule affecting price and dividends which would be equitable to all companies alike. Your Committee consider that any modification of statutory requirements should be temporary, and only continue for such period as may be affected by the war conditions.

Your Committee have realized the importance of adjusting any additional cost in supplying gas upon such a basis as will be fair and equitable to both consumer and shareholder.

It must be remembered in this connection that, while a large number of consumers in every case are people of limited means to whom any increase in price is a matter of serious consideration, the capital of most companies is distributed in small amounts among a large number of persons also of limited means, and in some cases among the workpeople of particular concerns, to both of which classes the falling-off in dividend is a matter of serious importance.

The conclusion your Committee have unanimously come to is, therefore, that provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances have been so seriously affected as to call for intervention.

Having come to this conclusion upon the general question referred to them, your Committee had then to consider on what terms and conditions such modification should apply; and here they found the greatest difficulty, owing to the variety of gas undertakings and the different conditions applying in almost every case.

Your Committee therefore recommend:

1.—That, with the view of maintaining in the public interest the stability of gas undertakings, some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances have been injuriously affected by causes arising out of the war.

2.—In the case of any company operating under the sliding-scale or the maximum price systems whose dividend on its ordinary stock or shares has been reduced to one-half of the standard or maximum rate, or to one-half of its average dividend calculated on the three financial years immediately preceding the war (whichever may be the smaller), the sliding-scale or maximum price shall cease to operate, and the company shall be entitled to charge such price for gas as may be held by the Board of Trade to be sufficient to provide such costs of manufacture and distribution as are properly chargeable to revenue account and such additional sum as will enable the company to pay a dividend on its ordinary stock or shares at the rate of one-half the standard dividend or one-half the pre-war dividend calculated in the manner set out above, whichever may be the smaller.

3.—That all gas undertakings belonging to municipal or urban authorities shall be entitled to increase the charge for supplying gas beyond the statutory maximum charge to such an extent as may be necessary to pay the actual cost incurred for such manufacture and distribution; but such

increase shall in no case exceed one-half the statutory price fixed for such undertaking.

4.—In order to ascertain whether a claim for increase can be established, the auditor of any gas undertaking seeking modification shall certify to the Board of Trade (or in case of municipal or urban authorities owning gas-works to the Local Government Board) that the position of the gas undertaking has been financially affected as set out in the preceding clauses, and shall further certify the amount required to be charged per 1000 c.ft. for gas in order to meet the cost of manufacture and distribution properly chargeable to revenue, and in the case of a company to pay such rate of dividend as is referred to in clause 2 hereof; and the Board of Trade or the Local Government Board (as the case may be) may, upon being satisfied of the correctness of the accounts upon which such certificate is based, forthwith authorize an increase in the price per 1000 c.ft. chargeable to the consumer to such an amount as will be sufficient to cover such cost and to pay such dividend.

5.—That the provisions above recommended should be carried into effect by general legislation, and not by Private Bill.

6.—That the provisions above recommended should have effect during the continuance of, and for one year after the termination of, the war, and for such further period as the Board of Trade may by Provisional Order (subject to confirmation by Parliament) determine.

ELECTRICITY SUPPLY MEMORANDA.

As in the gas industry, so in the electricity industry, there is not universal satisfaction with the new Fuel and Lighting Rationing Order. Opinion is divided. Some electrical men think their industry has on the whole done well, and that the Coal Controller has mixed reason with discretion. We are not surprised at this view. Others are far from satisfied, and want more. In our editorial columns last week, it was shown that the electric "fuel" allowance was 800 units per ton of coal, and that it should have been, taking the average coal consumption per unit generated, nearer 500 units. As it is, the user of the 800 electric fuel units per ton of unpurchased coal gets, in addition, an allowance for lighting, the same as the gas consumer obtains in excess of his 15,000 c.ft. It is true that there are comparatively few householders who use electricity for cooking and heating purposes; so that they will have to use fuel in some other form—gaseous or solid. But those who are economical with coal under the scheme will probably find they can be extraordinarily lavish with electricity for lighting, despite the average expenditure of 4 to 5 lbs. of coal per unit of electric energy generated. The position as between the gas and electricity consumer is not equitable by any means—seeing that every ton of coal the former does not use, but leaves free for gas making, returns so much for national service (which is not the case with electricity generation), while the total consumption of coal, on the average, to generate the fuel and lighting rations will be nearly equivalent to two tons of coal, and not one ton.

Rationing Disparity.

There is not any general enthusiasm in the electrical papers over the report of the Board of Trade Electric Power Supply Committee. This is not astonishing, as really the recommendations, so far as they go, have a strong family resemblance to much that has gone before. The greatest height to which enthusiasm is carried is found in the "Electrical Review." The report, according to it, is a document of the first importance; and "it marks an epoch in the history of electricity supply." Our contemporary also finds a daring spirit in the recommendations of the Committee; and it, among much else, bids those engineers who, under the scheme if adopted, may be deposed to be of good cheer, for compensation is recommended, and cheap electricity is going to offer glorious opportunities in new places for the exercise of talents. There is a general approval, too, of the other points in the report—the appointment of a central controlling body of Electricity Commissioners, the establishment of District Boards, and the taking over by the latter of the generating plants and work. It is a rare complicated condition of affairs from which co-ordination and an economical system of generation have to be produced. The "Electrician" approves of the Electricity Commissioners. It also thinks the Committee have boldly solved the difficulties by adopting the "principal" [*sic.*] of single ownership in each district—that is, through the District Boards. Gladness is also engendered by the suggestion that the District Boards should take over the stations which have been laid down by railway companies, dock, and other public utility undertakings. In this connection we are rather struck with this argument:

> Owing to the favourable position in which railway companies find themselves in regard to the purchase of coal, there is a tendency for the companies to erect stations for their own uses alone. From the national point of view, this policy is altogether wrong; and it is well that it should be changed.

According to this, the railway companies, on the ground that they are in a position to purchase coal cheaply, have put up their own generating stations for their own use; but, from the national point of view, this policy is wrong. "From the national point of view," therefore the policy is wrong to let the electricity industry use anything but coke or coal that is unsuitable for the production of other necessaries. The rich coal that is in so many cases sent to total destruction under the electricity station boilers should be first carbonized in gas-works retorts. It is a pleasure to see an electrical contemporary putting national considerations before those of any single industry, because from that quarter we may expect to derive assistance in dealing in a proper manner with the fuel problem. The "Electrical Times" adopts a non-committal attitude. "Meteor" wants to sleep well over the report; but he does say that its main point of centralization and super-stations, from a technical point of view, is by no means new, nor is its scheme of governing and administration. "Electrical Industries" looks upon the report in the light of a compromise; and it considers that it is certain legislation will follow on the lines mapped-out. But in its opinion, the Committee have opened the door that leads to nationalization. The "Iron and Coal Trades Review" regards the difficulties with which the Electricity Commissioners will have to deal as serious, and the various interests conflicting; but nowhere in its comments do we see that it regards the difficulties as so serious as to be insuperable. The "Engineer" is inclined to believe that the gulf between the advocates of rival schemes is less wide than the partisans of these plans assert, and that the proposals in the report may pave the way to a compromise which will achieve what is necessary without any undue hardship to the existing authorities.

Reception of the Board of Trade Committee's Report.

It matters not what the Government Departments touch, if they can introduce electricity anywhere they will do it; and the reason is that the departments who look after national premises have upon their staffs electrical experts, and not gas experts. They have proved completely that they lack impartiality. Time and again there have come to knowledge instances of the eviction of gas even during war time in order to make place for electricity; and the expense of doing this has been no hindrance. The requirements of the Government from gas undertakings have not the slightest weight with them. They are themselves electrical, their work is electrical, and their narrow view is that they would be betraying their own profession if they considered national interests, and did not on all possible occasions kick-out gas and favour electricity. Expense to the country, relative efficiencies, fuel economy, and requirements of the country are nothing to them. When charged with this sort of thing, reply is couched in a naïve evasiveness. There was another illustrative case of what we allege in the report of the National Gas Council as published last week. It was one in which pressure had been brought upon the owners of a works manufacturing munitions to adopt electric power, though they had in use a gas-power plant, and had recently had a new gas-main laid into the works, while electric power would have required the laying of a long length of cable. This is an instance of advocacy producing waste just the same as goes on in Government premises. Government officials who through the war are brought so largely into contact with private factories have no right to exert their influence in this way. It is not their business. If there has been (as we believe there has been) any denial of any interference in this instance, then it is untrue. Gas undertakings cannot continue to stand this sort of thing; and it would be well for the officials in question to try to cultivate impartiality. The Government asks much from gas-works; and yet these men are allowed to go about doing all the possible injury they can to the industry. There is no excuse for it. The ordinary form of protest seems to be futile. When protest is made, explanation of sorts is given; but there remains the certainty that on the first possible occasion something of the same kind will again happen. The electricity industry recognizes the advantages of interlinking with the Government; hence the proposals in the new schemes for preferential consideration at the hands of the Government, and financial collaboration in furthering the interests of the industry. Certainly there has been material advantage to the electricity industry in having electrical officials in Government Departments.

The "Unseen Hand" of the Government Electrical Official.

Some of the municipal authorities of the country are still anxious to get permission to carry out extensions of plant in face of the reports of the Departmental Committees on the future of electricity supply in the country; in face of the shortage and price of materials and labour; and in face, too, of the coal position. The feeling seems to grow among them that they ought to have preferential treatment. But there are other industries that think they are equally as important in war as in peace time; and these industries get scant consideration—at all events, one of them does so. But it and others have to grin and bear the ills of the times. The Electricity Committee of the Halifax Corporation are incensed at the refusal of the Director of Electric Power Supply to give the Corporation sanction to purchase a new boiler for the electricity station. The Committee have protested against the decision, and have placed on record that they cannot be held responsible if the supply has to be curtailed through lack of steam. The Coal Con-

The Crave for Preferential Treatment.

troller has something to urge in this matter; and he has said to gas and electricity administrators jointly that his rationing scheme must effect a reduction of fuel use, and that the consumption of gas and electricity by private householders and non-essential-to-the-war industries must give way to the supply of the needs of the essential munition factories. This being so, it sounds a bit childish for the Halifax Committee to talk of not being held responsible for a curtailment of supply. There has to be a compulsory curtailment of the use of fuel. However, the resolution of the Committee is going to be sent to all the cities and the county boroughs in Yorkshire with the view to a joint protest to the Ministry of Munitions against the treatment accorded to municipal corporations with regard to extensions and maintenance of existing electric power stations. Not much good is this likely to do. The treatment is no worse than is applied to other essential industries, and "essential" in the case of the gas industry should be printed in large capitals.

An Initial Failure of National Kitchens.

Reading between the lines of a paragraph in "Cooking and Heating Notes" in the "Electrical Times," something appears to be going wrong with the National Kitchens. The novelty, it seems, is already wearing off; and people are showing a preference for the old custom of preparing their own food. There is the blunt acknowledgment that, since the adoption of the national rationing scheme, several public kitchens have noticed a falling-off of business. Many authorities consequently feel that the urgent need for the establishment of National Kitchens no longer exists. Patrons object to part with coupons for meat dishes; and considerable waste and loss have followed. This being so, at one sheer drop, out of the reckoning goes the case for the electric-oven, which case suspended itself on that slender and deceitful thread—the extraordinary saving in the shrinkage of meat where the electric-oven is used. Nothing will induce the electrical people to enter into a public demonstration to show that, given equal temperatures, joints will shrink no more in one type of oven than in the other, and that the electric-oven can be made to show worse shrinkage results than the gas-oven by working at unequal temperatures. But to proceed with the National Kitchen experiences as recorded in the "Electrical Times," it is stated that in certain cases it has been proposed to close the kitchens during the summer months; and this course has been adopted—for example, at Willesden—where the kitchen has been running at a loss since rationing was instituted. The good results at Poplar (much of the cooking in which kitchen is done by steam) are quoted; but here a restaurant has been combined with the kitchen. It seems pretty certain that the character of the population in a district has a good deal to do with success or otherwise. It is stated that it is the official view that what is being accomplished at Poplar could equally well be done in other districts. We have not the slightest doubt that the official view also embraces the successes with gas-operated kitchens. [Since the foregoing was put in type, Mr. J. R. Clynes, the Food Controller's faithful parliamentary deputy, has stated, in a review of the food situation, that national kitchens have been very successful in some parts of England, but not in all. This is probably because they are opposed to our traditional family habit; but he feels that they can be conducted on such lines as would enable people to patronize them without loss of respect.]

The Electric National Kitchen Examined.

In comparison, however, with gas installations in National Kitchens, the number of electric installations are few; and, as we have before pointed out, these few have been made, not on the ground of practical all-through efficiency, but by interested parties. It is also well known that many large kitchen equipments of electrical appliances that have been made have, for whatever success they have achieved, to thank expert electrical nursing and maintenance, and an indulgent cost for the heating energy. The true tale of failures and upkeep will never be published. That is not the policy of the electricians. Nor will the true tale of the waste of heating energy and other valuables that arise through the conversion of coal into electricity for heating purposes be told by the electricians. These are things they must do their utmost to hide in a cloud of secrecy. Gas undertakings have now a good many records of the game that has been played with the unsophisticated householder, and others with large swallowing capacity. Mr. Creasey in the illuminating paper on the subject, which he compiled from his own practical experiences, and which was read at the recent meeting of the British Commercial Gas Association, recounted a number of actual failures which he has met with in London; and some of these were expensive installations. In connection with them gas has again come into its own. Some people have had to pay dearly for their reliance on the electrical word. Experience has proved to them how thoroughly they were duped. The paper also gives comparative costs of representative pieces of electric and gas apparatus. Costs of upkeep, costs of "fuel," the hot-plate difficulty, irritating delays, unpleasant shocks, the waste-of-meat fallacy, and other points are dealt with by Mr. Creasey. It is a paper reprints of which gas undertakings should widely distribute; and they can do this as soon as the British Commercial Gas Association have the supplies in hand to meet all demands made upon them.

COMPULSORY ARBITRATION DISAPPROVED.

The Whitley Committee on the relations between employers and employed, have presented a further report, which has been published by Dr. Addison, Minister of Reconstruction. It deals with conciliation and arbitration. The Committee pronounce definitely against any system of compulsory arbitration, on the grounds that it is not generally desired by employers and employed, that it has not proved a successful method of avoiding strikes during the war, and that it would be less likely to be successful in time of peace. They also pronounce against any scheme of conciliation which would compulsorily suspend a strike or lockout pending an inquiry. The Committee advocate the continuance, however, of the present machinery for voluntary conciliation and arbitration, and hope that the setting-up of Joint Industrial Councils (on the lines recommended in their earlier reports) will tend to the growth of such machinery.' They consider that there should be means for holding independent inquiry into the circumstances of a dispute, and for making an authoritative pronouncement thereon without the compulsory power of delaying the strike or lockout. Their main constructive suggestion is that a Standing Arbitration Council should be established on the lines of the present temporary Committee on Production. To this Council disputants would be able voluntarily to refer such differences as they are themselves unable to settle. It is suggested, however, that single arbitrators should be available for less important cases which could be heard locally. It is further suggested that the Standing Arbitration Council should take means to secure the co-ordinatian of arbitrators' decisions. The Committee are opposed to the enforcement of awards and agreements by means of monetary penalties. The report is available from H.M. Stationery Office, Imperial House, Kingsway, W.C. 2, and only costs 1d.

CANADIAN GAS ASSOCIATION.

The proceedings of the Annual Conventions of the Canadian Gas Association are printed in handy-sized little volumes, copies of which for 1916 and 1917 have been received from the Secretary and Treasurer, Mr. George W. Allen, of the Toronto Consumers' Gas Company.

In the first-named year, the convention was held at Quebec. and in 1917 at Toronto; the President elected for 1916-17 being Mr. James P. King, of Stratford (Ont.), and for 1917-18 Mr. J. M. H. Young, of London (Ont.). Turning to the 1917 proceedings, it is seen that two papers were read, which was fewer than the customary number; the meeting having been confined to one day, instead of two, as on previous occasions. Of these papers one was by Mr. H. E. G. Watson, of Toronto, who dealt with the question, "How Can the Smaller Gas Companies Obtain Industrial Fuel Business?" while the other, by Dr. Lee Galloway, the Educational Director to the American National Commercial Gas Association, was entitled the "Relation of Employee Training to After-War Conditions."

WONDERFUL EVOLUTION OF COAL AND ITS PRODUCTS.

By William Leighton, of Leeds.

(*Concluded from p.* 498.)

Past Waste in Burning Raw Coal.—The Smokeless Fuel Problem.

It is acknowledged by scientific and practical experts that in the past as much raw material has been burnt as would have yielded millions of gallons of petrol, and that most of this waste has gone up our chimneys. Now all this is being changed by a rapidly extending system of distillation. It is asserted that every ton of coal distilled gives 5000 c.ft. of gas, 33 gallons of tar, 20 lbs. of ammonia, and 3 to 4 gallons of benzol. A high authority considers it possible that a ton of coal, costing £1, may yield 18s. worth of coke, 18s. worth of gas, 33 gallons of tar, worth 8s., and 20 lbs. of sulphate of ammonia, worth 2s.—thus totalling a profit of 26s. Attempts have been made to produce smokeless fuel by low-temperature carbonization of coal; but so far they have not met with the degree of success hoped for. However, the millions of people who deplore the necessity of living under a continuous pall of smoke which the production of war material has made much denser, may find a ray of consolation in the fact that the Government is interested in plant now being put down at or near Barnsley, about which expectation runs high. At this particular time, the experiment does not appeal with much force to coal gas manufacturers. Expert opinion strongly inclines to high-temperature carbonization, with the object of securing the best chemical results. Indeed, present tendencies seem to definitely point to an increasing adoption of gaseous instead of solid fuel for heating. The same plant may be used for low or high temperature carbonization; but low-temperature carbonization is considered by its advocates to waste time that is now so precious.

In passing, it may be mentioned that before the war coke sold at 12s. to 14s. a ton; now it is 24s. The range of present prices

for gas coal is from £1 to a little over 30s. a ton in the North, where the coal is, and from £2 to approaching 55s. in the South, where it is not. Southerners have now to rely much more upon rail-borne coal than they did before the war. What users of household coal may think of the rationing of fuel—just announced, and rendered necessary by the "combing" of 50,000 more miners, and by transport difficulties—it is too early to predict. The coal-producing Northern Counties, from which half the new levy of miners is being drawn, are evidently disposed to meet the Coal Controller's proposals in a friendly spirit. Fifty thousand fewer miners will mean millions of tons less coal; yet more than a hundred county, borough, and smaller Yorkshire authorities, have wished success to Sir Guy Calthrop's proposals. As Yorkshire housewives are their own bakers, they are to be allowed a little extra coal. Should anyone complain that the gas bags which are largely supplying the place of petrol for driving motors must add seriously to the weight of coal consumed, the reply of the gas-works manager is that the huge increase in petrol consumption is so great that it is easier to get coal than petrol. Hence gas for motors is the lesser evil.

Among the various recent tendencies of coal carbonization is that of the continuous carbonizing vertical retort system, worked at high temperatures, and steamed for the production of a preparation of water gas. These processes bid fair to increase the output of residuals to a very large extent—thus making for economy in production and towards meeting the increasing demand for gas. The yield of gas may be increased from 60 to 100 p.ct. with a loss of only 4 to 10 p.ct. of lighting power. Before the war Berlin extracted gas residuals on a far larger and more scientific scale than we did; consequently Berlin's gas was never more than 12-candle power. That is the average quality of the gas now being supplied in Leeds, compared with an average of 15 candles before the war. One local authority in the United Kingdom has actually been able thus to reduce the price of its gas during the war. The public get a little less light; but there is a far greater output of gas and its bye-products (which now really matter most) and the price of gas is kept down. The great efforts which the war has called forth have resulted in an increase of tar, from which fuel oils are made, to the extent of 50 p.ct.; and 60 p.ct. more ammonia has been obtained. So that if Parliament would put a little more elasticity into its requirements of a certain illuminating power for gas, the present position of the carbonizing industry is such that this would tend towards a maximum of economy and to a much greater production of both gas and its residuals. Gas-works managers urge that they should be allowed to aim at the sale of so many B.Th.U. rather than of a gas of fixed calorific power.

Is Petroleum Worth Drilling For?

One of the foremost objects at which every man of science or industry concerned is driving is to get an ample supply of oil fuel for our navy, which is now using creosote. Another aim is to speedily multiply the production of every sort of bye-product that enters into the making of high explosives. A third purpose is to add all they can to the range of raw materials required for variety in dyeing enterprise, which is endeavouring to make up for past shortcomings. The entire dyestuffs industry employs gas tar as the raw material for the preparation of the crude products of this industry. The yield of tar obtained in gas-works depends on the character of the coal, and ranges from 4 to 8 p.ct. Coals rich in oxygen usually furnish the highest tar output. Tar distilled in vertical retorts is rich in light oils. As to the first-mentioned of the above-stated aims, many propositions are on the carpet. One is that 20,000,000 tons of coal, carbonized by the low-temperature processes, would yield 1,000,000 gallons of fuel oil for our navy, and 15,000,000 tons of coke for a multiplicity of purposes—some apparent, others to be created by the needs of the times. Would there be time for this low-temperature process? At some of the most up-to-date gas-works in England the manufacture of residual products has been taken up on a large scale, which is rapidly extending, and the problem of manufacturing sulphate of ammonia is declared by Lange, the German author of "Bye-Products of Coal Gas Manufacture," to have been definitely solved.

And now crops up the query, Is drilling for petroleum, wherever there is a ghost of a chance of finding it or any other sort of oil, a feasible or paying proposition? This is just what the writer and many far keener students would like to know. Anyway, the search for petroleum is one of the duties that the Government have allocated to the newly-constituted Fuel Research Board. How to make the most of our coal by economical processes is chiefly what the Committee is out for; yet as a bye-product of its *raison d'être*, it seems to be expected to ascertain whether there exists under our feet enough petroleum or any other oil worth boring for and working. As to where and in what quantities petroleum or oil may be found that might do duty for fuel, it is a case of "many men, many minds." Geologists have marked out certain districts in which they think it would be worth while to bore. It is generally believed that, if there is any petrol, it lies more than 1000 yards below the surface, underneath the most recently discovered coal measures. In opening out new coal beds lately in the North of England a lot of crude "oily stuff" has been unearthed; but neither the coal prospectors nor the workers seem to have thought it important enough to divert their attention from the coal they were about to win.

Geological opinion is very much divided as to what fruit drilling for petroleum might yield. One set of geologists is strongly in favour of extensive tests, and another set declare that they will have little result. Practical evidences of the existence of petroleum in England are so far rather vague. The discovery of an "oil spring" in a Dublin cellar, some years ago, raised expectations; but they were dashed by the discovery that this was a leakage of refined oil from a neighbouring oil-store. Other recent recurrences of oil include one at Ashwick Court, near Shepton Mallet, and at two spots two miles thence. The oil here reported is said to resemble in some respects the refined product. The increase of flow at this spot is associated with an earthquake in 1892, although it had been noticed a year earlier. Mr. W. H. Dalton, an eminent geologist, thinks a continuous flow of oil at Heathfield, in Sussex, is by no means tempting from a commercial point of view. Petroleum has been obtained in small quantities from Kilham, near Newark; and from a boring at Norton, near Stockton-on-Tees, black oil has been found to rise continuously. Mr. Dalton, however, tells the Technological Institute that promiscuous boring would be commercially valueless, though he adds that nothing but the drill and pump will decide the point with absolute certainty.

Occurring, as it did, just when the Government Research Committee was starting work, the discovery of oil of some kind two miles from Peterborough naturally aroused special interest in the minds of the many people who went to see it. To the non-scientific onlooker, the liquid pumped from two wells suggested natural petroleum; but Sir Boverton Redwood, the Government adviser, promptly dashed the hopes of the discoverers by his verdict that the liquid was refined and not natural oil, and that it might have leaked to the spot from anywhere at any time during the last thirty years. The announcement the other day by Mr. Bonar Law that satisfactory arrangements had been made for boring for petroleum, under which no legislation would be necessary, disposes of the difficulties about royalties, and set experts thinking and planning. The Government is now being urged to encourage the possibilities of a yield of petroleum in the Cleveland district of Yorkshire. Oil is said to have been met with in considerable quantities in several parts of the Middlesbrough mining district; and the results of special borings are said to favour further trials. A belief is prevalent that there would be little difficulty in setting the oil industry on its feet if the Government would forego taxation for five years, and thus allow the colliery owners to make a little profit for themselves. The Ministry of Munitions claims to be seriously engaged in efforts to develop native oil deposits. The Parliamentary Secretary to this Department says that the Scottish shale industry has been appreciably increased; that undue expectations seem to be entertained by non-experts regarding the shale deposits in Lincolnshire, Norfolk, and Dorset; and that it seems unlikely that any very large production will be obtained from the English shale series. So for quickly obtained supplies of fuel oil, gas-works and collieries must be encouraged. The Government have selected three collieries at which to instal the requisite plant and retorts.

The Enterprise of Gas Engineers and Managers.

Rumour has it that, in order to direct the energies of producers of gas and its residuals, yet another Controller may or should be appointed. If an expert could be found who would help to direct engineers and managers of municipal and private gas undertakings how to produce the maximum of gas for illumination, power, light, heating, and other purposes, and at the same time make the very most for war and industrial uses of every atom of bye-products, the sooner he is sought out and empowered with authority the better, though after all gas managers generally are energetically rising to the great occasion with a skill and indomitable purpose that does them infinite credit. A spirit of patriotic emulation is stirring them and their staffs to a degree of achievement never dreamt of as possible till the necessities of the war awoke all concerned to the unsuspected potentialities lying hidden in raw coal. What is chiefly required seems to be, not so much official direction in details of gas and residual production, but enough authority to enable the managers themselves to get all they can out of their plant and workers, and to find adequate and well-chosen outlets for their productions.

Heating Standards in Indiana.

Prevailing regulations as to the quality of "artificial" gas in Indiana require that it be of 600 B.Th.U. value per cubic foot; though nothing is said as to composition and process of manufacture. Mr. J. H. Maxon, the General Manager of the Central Indiana Gas Company, says that if the best economic conditions are to be secured in the matter of producing and supplying manufactured gas, there must be greater latitude as regards heat value; and wherever a gas undertaking can show that advantage can be secured by supplying gas of lower heat value than the present standard, it must be allowed to make the necessary adjustment. The growing demand for manufactured gas to be used in industrial heat applications, offers vast possibilities to the gas manufacturer; and he thinks the distribution of industrial gas of a different quality to that supplied for domestic use, and by means of separate systems of mains, is in immediate prospect. The fallacy in his State, of attempting to furnish manufactured gas for the general heating of houses and buildings, has become fully apparent. However, before much can be done towards bringing into effect material changes in the character of gas supplied, it will be necessary to get the public mind, and the mind of the public officials, in whose hands now rests the power of regulation, to see that any alterations proposed are mutually advantageous to the public and the gas undertaking.

WAVERLEY ASSOCIATION OF GAS MANAGERS.

The Annual Meeting of the Association was held in the Cockburn Hotel, Edinburgh, last Thursday—Mr. JOHN RICHMOND, of Penicuik, in the chair.

PRESIDENT'S ADDRESS.

In addressing you, I want to be brief; still, I want to touch on as many subjects concerning our industry as I can bring to mind, in order to elicit and provoke a discussion which may be mutually beneficial and advantageous to the industry. At last year's Gas Institution meeting, Lord Moulton described the gas industry as indispensable to civilization. His words seem true; and the fact is being impressed more on the minds of the general public now than ever before. It has truly been a most momentous year. Such an impetus has not been given to the gas industry since the advent of incandescent lighting put new life and vigour into our profession nearly thirty years ago—the difference being that then the impetus given was in gas used for lighting purposes, whereas at the present time it has been in the use of gas for industrial purposes.

It is true we have had our vicissitudes, our trials and troubles, many of them hard to overcome. But the fact that they have been overcome puts us in a more secure position at the present time. Let us consider a few of our troubles. First, the financial aspect of making ends meet has been a severe trial to many undertakings. This has not been felt so much in Scotland as in other parts of the kingdom, where statutory obligations as to maximum prices and the sliding-scale have been in force; and in many cases the legislature has had to relax or cancel the obligations imposed upon undertakings, in order that they could be in a position to carry on without loss.

In the matter of coal supply, the past year has been a worrying one for most of us. The coal has not been of the quality formerly supplied; and the necessary quantity was scarcely procurable. In order to assist matters in coal supply, a splendid scheme of coal distribution was put in force by the Board of Trade—entitled "The Coal Transport Reorganization Scheme." In effect, the scheme facilitates deliveries, and had for its main object the providing of coal for any industry from its nearest collieries—a state of affairs which should naturally appeal to every sensible person. Unfortunately, the scheme does not go far enough, and enforce that the price from the nearest colliery (quality considered) should not be in excess of that chargeable by some firm more distantly situated.

In the case of residuals, too, gas undertakings have been sorely affected. It is a very strange state of affairs that, notwithstanding the exceptional demand for crude tar for distillation in the manufacture of toluol, carbolic acid, dyes, and many other necessary and expensive products, and the demand and price obtained for sulphate of ammonia from ammoniacal liquor, the gas companies who sell their tar and liquor to distillers are not receiving one-half the price paid in pre-war times. This is not as it should be, and points to a formidable combination among tar distillers to keep down prices and healthy competition, while they reap exorbitant profits. Unless some change takes place in this matter of residuals, gas undertakings will be forced to combine and, in central established distilleries, work-up their own liquid bye-products on a co-operative and profit-sharing system. I, however, am pleased to observe recently a tendency for distillers to become more considerate in their dealings with gas undertakings.

In the case of coke, also, we have had the usual winter's drag on the market, and consequent diminution in selling price. This likewise is not as things should be, as wherever solid fuel is required, coke is most economical and more efficient than coal. We have had appeals by the Board of Trade, the Coal Controller, the Ministry of Munitions, and thousands of circulars issued to consumers by the National War Savings Committee to save the country's coal and substitute coke. But all has been to little or no effect; for, like the appeal to the honour and intelligence of the general population to economize in food (which fell on deaf ears), so has the appeal to coal users; and as in the case of rationing of food, so must the day come when coal shall be rationed, and no one be permitted to use it without a licence and a definite guarantee under a heavy penalty that it shall not be used wastefully as at present, when many hundred of thousands of pounds worth of valuable bye-products are permitted to go up smoke-stacks and vitiate the atmosphere of village, town, and city. One cannot speak too strongly on this subject. Our coal supply is the most precious heritage with which Nature has endowed the country; and to see it wasted to such an extent as occurs even at the present day is an industrial disgrace. It cannot be that steam-users are unaware of the waste incurred by the consumption of raw coal, or that they are equally ignorant of the advantages accruing to their country and also to themselves by the substitution of coke as solid fuel. It is due to unreasonable prejudice, which is equally as bad as gross ignorance, and cannot be justified by sound reasoning. Therefore, the time has come for those whom we place in authority to put an end to such waste. But, unfortunately, these very authorities forget the maxim that "example is better than precept," and are themselves very much to blame.

In the matter of general supplies, gas companies and corporations have been hard hit. Meters, pipes, fittings, and sundry stores have advanced so enormously as to necessitate many undertakings temporarily giving up the fixing (free or on hire) of stoves, cookers, &c. In the case of absolutely necessary materials for repairs—such as refractory materials, fire-bricks, and retorts—these have gone unduly high; and when one sees firms making these products paying a dividend of 35 p.ct., I say something is wrong. It looks very like profiteering.

Labour has also been another worrying problem on gas-works; and, unfortunately, we are not done with it yet. The incessant demand for more wages, coupled invariably with less work, seems never-ending. This demand is always based on the same theme—viz., cost of living—notwithstanding the fact that the Government by subsidies from public money of fully £50,000,000 per annum have reduced the price of necessaries which practically amounts to a present of several shillings per week to the class who cry out for more wages. Still the demand goes on. Is the demand justified, and can we do anything to mitigate the discontent? It is a serious economic problem; but a better understanding between the managers of the various gas-works might do a great deal to prevent this endless competition.

GAS FOR INDUSTRIAL PURPOSES.

We will now pass to the brighter side of our industry, and what do we note—a general demand for our commodity such as we could not have dreamed of. This demand has been brought about principally by the greatly extended use of gas for industrial purposes. There is scarcely a metallurgical industry but has had coal gas adapted to its use, with economical results to the manufacturer. The smelting of gold, silver, and precious metals in the Royal Mint by coal gas saves many thousands of pounds per annum. Its use in general brassfoundry work is common; and its utility and efficiency in case-hardening, annealing, and other work have made gas industrially indispensable. But it is to the newer and more recent application of gas to motive power that many of us look to the extended use of our commodity. It is strange that it required a great war to bring the possibilities of coal gas in this direction to the front; but out of evil good often comes; and many industries besides that of gas manufacture will in time to come permanently benefit by the necessities imposed by war-time conditions which are just now presumed to be only temporary.

How has gas-motor traction come about? First, by the primary law of supply and demand, supplemented by that all-powerful factor of pounds, shillings, and pence. The demand for motor fuel in the liquid state being greater than the supply, caused the price to increase until someone looked to gas as a substitute. Its possibilities at first did not seem so great as at present; but when actual costs and efficiency proved its capability, and on an average the cost was about a quarter of that of petrol, an impetus was given to gas-motor traction which we little thought of. Is this development a war-time expedient, or has it come to stay? This is the question we have to put to ourselves, and make arrangements accordingly. I consider it has come to stay, and will be ever on the increase. There is little prospect of motor spirit ever being reduced in price to compete with gas on the score of economy, as the total world's production of oil from known sources is decreasing, while the world's demands is ever on the increase. There remains the development of yet-undiscovered oilfields, and the augmentation of manufactured mineral oil to make good the balance between supply and demand. But whichever way we look, there is no prospect of liquid fuel ever again competing with coal gas as a motor fuel on the score of economy. The only advantage which petrol has over coal gas is that it contains a large amount of energy in a small space. But gas, besides being more economical, does not necessitate pre-purchase and dangerous storage to the user, and is conducive to clean cylinders and the absence of injector troubles, and no starting difficulties in cold weather.

MOTOR TRACTION SUPPLY.

I have been favoured with a few statistics of practical running costs by the General Manager of the Scottish Motor Traction Company, a company who are among the largest users of gas for motor traction in the British Isles. His figures as to efficiency of gas bear out what we have been already told—that 250 c.ft. of gas is equivalent in practical working to 1 gallon of petrol. But the flexible containers on their heavy buses cost approximately £50 each; and those on the long hilly journeys, run in all weather, are subject to considerable wear and tear. The upkeep of the containers has cost 1¼d. per car-mile; and with the cost of gas, which comes out at 2·17d. per mile, and attendant's wages at the filling station, the total cost is 3⅛d. per mile. This price is about double the cost of running on petrol in pre-war times, but is a considerable saving compared with petrol at present prices.

The Company are experimenting with a semi-rigid cover over their container, in the hope that the excessive wear and tear might be reduced. The experience with gas in the engine is that gas has a much more drying effect than petrol. Valves become dry and sticky when running on coal gas; and to endeavour to get over this they draw in air for the coal gas through the crank

chamber, so that the air absorbs a small proportion of oil in a vaporous state, and quite good results are now being obtained by this arrangement. Another trouble which the Company have had is with the carburettor, needles, weights, and floats. When running on coal gas the petrol is turned off, so that the float chamber of the carburettor becomes quite empty. The vibration then acts very severely on the float, needle, and weights, and every day or so these have to be seen to. Otherwise the petrol leaks past the needle-valve all the time the petrol is turned on. This is due to the needle-valve having spoiled its seating and the float in many cases becoming punctured. The Scottish Motor Traction Company are experimenting to overcome this trouble, and no doubt will evolve something satisfactory. The Company have not yet experimented with compressed coal gas, owing to the difficulty of obtaining cylinders and compressing plant, but they are thoroughly satisfied with the economy of coal gas traction in present circumstances.

To turn this proved economy into a permanent benefit to the industry, we must be prepared to give an efficient gas supply at a reasonable cost to motor users. The flexible container has come in for a considerable amount of abuse because of its unsightliness; but this container has a long future before it. It is only in large industrial centres that elaborate and costly compressing plant can be introduced to meet a demand for gas traction supply in compressed metallic cylinders. Hence the general utility of the flexible container, notwithstanding its unsightliness, will retain its hold on users for a long time to come.

REDUCED QUALITY: ADVANTAGES AND DISADVANTAGES.

In these days, when the candle-power standard has become obsolete, and the stripping of gas of its illuminating hydrocarbons has become nearly a necessity and is permitted by law, the relative value of gas to consumers is represented by its thermal efficiency. At the present time great divergence of opinion still exists as to what the standard of thermal efficiency should be fixed at. The argument used—that gas of (say) 450 B.Th.U. is as efficient in practical use as, say, gas of 650 B.Th.U.—is undoubtedly correct. But this does not say that gases so widely differing in thermal value are of equal value to the consumer, although they may be equally serviceable. One c.ft. of gas of 450 B.Th.U. requires about 5 c.ft. of air to complete combustion—giving (say) 6 volumes of self-combustible gas; whereas 1 c.ft. of gas of 650 B.Th.U. requires fully 7 c.ft. of air, giving 8 volumes of self-combustible gas. Thus if 450 B.Th.U. gas is sold at 3s. per 1000 c.ft., 650 B.Th.U. is worth 4s., or 25 per cent. better. Power users in motors ought to be acquainted with this, as gas supplied by a country village where oil-washing is not in use, and a large proportion of cannel coal is used, may be worth more to them, even at the higher price, than the gas supplied by our large city works. We should not deceive the consumer in this matter; and where the thermal value has been brought down, the selling price should be brought down correspondingly, to give the public equal value. The lower the calorific value of the gas supplied, the greater will be proportion of inert gases which the public should be guarded against.

The reduction in the candle-power standard and the substitution of thermal value has given a great incentive to large productions of gas per ton of coal carbonized; and many works now claim makes of 15,000 c.ft. per ton and upwards. In many cases the increase in make is due to resorting to steaming in vertical and even in horizontal retorts, whereby a considerable quantity of blue water gas is generated. This has the advantage of giving gas comparatively free from inert gases, and seems to be more fair to the general public than the supply of large volumes of gas generated in water-gas plants. There is only one step between honest and dishonest trading; and at the present time, with the craze to get as much gas per ton of coal as possible, we are apt to forget that we may be supplying the public with a quantity of inert gases from which they obtain no value, and which they have to pay for. If such a practice becomes general, sooner or later we shall have legislation to enforce that all the inert gases be eliminated—just as formerly candle-power was insisted upon and sulphur compounds kept down. I have always been taught the formula that just as there are 20 cwt. in a ton of coal, so it is good practical working to obtain a combined figure of 20 in gas and coke saleable in the carbonization—say 10,000 or 12,000 c.ft. of gas and 10 or 8 cwt. of coke—saleable residue. In practical working few works in Scotland come up to this standard; therefore I think they could safely retain this figure as an incentive to obtain results and practical working for some time to come.

We must also take into consideration the fact that inert gases in our commodity have a very deleterious effect upon our plant. Many years ago I had occasion to repair a gasholder in a works where partial oxide revivification *in situ* was in use and had been for a few years previously. I was so struck with the amount of internal corrosion which had taken place on this holder that I called my employers' attention to the fact, and, after having the tank water sampled and tested, I came to the conclusion that the oxidation was attributable to the "*in situ* air purification process." Further investigation has shown me that in this and other towns where air purification is in use, mains, services, and even meters are internally corroded—a thing unheard-of in the old days of genuine gas manufacture from cannel coal. And if ordinary air purification has been responsible for so much depreciation, what will be the effect with the addition of carbonic acid, cyanides, and other corrosive compounds? It might be advisable to ponder over the subject and think: (1) What benefit is the consumer deriving from this stretching and adulteration of gas through our craze for big makes per ton? (2) Is the game worth the candle to our employers, if depreciation of plant is taken into account?

METER HIRE.

In these days of democratic considerations, it behoves us to deal equitably with the public; and in this connection I was impressed with a letter in the technical journals on the subject of meter hire. Many gas undertakings in Scotland supply meters free; and the writer of this letter pointed out that the giving of meters free of hire is penalizing the large consumer for the benefit of the small one. It is obvious that, to have fair dealing, a fixed hire and fixed price of gas should be enforced; or if preferential treatment is to be given, it is the large consumer who deserves consideration.

PROFITEERING BY SCOTTISH GAS COMPANIES.

In Scotland, in those works which are owned by municipalities, under the Burghs Gas Supply Act, consumers reap all the advantage of economical working, but where the gas supply remains in the hands of private companies the charge of profiteering can be laid against many. Statutory maximum dividends ought to be enforced on all gas companies. Gas companies are not subject to undue risk and fluctuations; and being practically monopolies, they should be limited in their dividends.

OXIDE FROM IRONSTONE WORKINGS.

I am sorry there is nothing particularly new to bring to your notice in connection with my own work during the past year; but I may mention that the material in use for purification is such as will interest you. Some five years ago (before the time when bog ore and chemically prepared oxide of iron had their prices inflated by the war), I observed a deposit of iron oxide at a disused coal and ironstone pit. This pit, like many others, had to let the water which was impregnated with iron ore settle in large ponds before allowing it to pass to the river. The iron in suspension was assisted in its precipitation by the addition of hydrated lime; and, as a consequence, there remains in the bottom of these ponds a highly valuable purifying agent, capable at one and the same time of thoroughly eliminating the sulphuretted hydrogen, carbonic acid, and sulphur compounds. Having secured permission of the proprietors to experiment with this precipitate, I obtained sufficient to charge two 10 ft. square purifiers, with results so highly satisfactory that I have used this material exclusively ever since, and brought our purification costs down to 0·12d. per 1000 c.ft. for material and labour. Over 5,000,000 c.ft. of gas was passed through the first purifier before a change was made; and even at that, the cause of change was back-pressure. I feel sure that thousands of tons of similar material could be cheaply procured in the country, as I personally know of ironstone workings that were forced similarly to precipitate the iron from the mine water before allowing it to flow to the river. I give an analysis of this oxide, as also of a sample of partially fouled oxide, which shows its efficiency:

Sample of Precipitated Oxide of Iron from Penicuik.

	Per Cent. As Received.	Per Cent. As Dried.
Ferric hydrate ($Fe_2O_3H_2O$)	71·44	87·21
Lime (CaO)	—	1·98
Organic matter	—	21·27
Moisture	8·08	

Sample of Partially Spent Oxide from Penicuik.

	Per Cent. As Received.	Per Cent. As Dried.
Sulphur	27·15	31·4
Moisture	13·4	

PRODUCERS IN THE BENCH ALONGSIDE THE OVENS.

Some two years ago I designed a new bench of retorts, containing two ovens, one for eight and the other for six retorts. I arranged these ovens to be fired from producers placed in the bench alongside the ovens, and not directly underneath, as is the general custom. I have had very good results from this class of setting in other works where English coal was used. But I have found that the class of coke which we obtain from Scotch coal is not suitable for producers of this sort; and although my settings have given good results, still I would scarcely repeat the experiment in Scotland had I occasion again to erect a new bench.

MAINS EXTENSION.

Just previous to the outbreak of the war I carried out an extension of our main to the village of Roslin. This extension ran to about four miles of 4-in. and 3-in. steel main with oxy-acetylene welded joints—thus forming one continuous tube capable of standing a high pressure. The main while being laid was tested to 10 lbs. per sq. in. air pressure, and the gas sent along the main during the lighting hours has an initial pressure of 15 in. water gauge—an underground governor being provided to regulate the pressure to Roslin village. The gas compressor used at the works is direct-driven by a gas-engine of suitable capacity and gives a very steady gauge. But as the compressor was required only during lighting hours, it occurred to me that I might with advantage put it to another use. I accordingly, by means of a few connections and valves, adapted the compressor to act as a spare exhauster. When using it in this way I draw the gas from the purifier outlet pipe, thereby putting the whole of the plant, with the exception of the station meter, under a vacuum.

I find the arrangement works out capitally; but, not having a retort-house governor, care has to be taken that there is no excessive vacuum at the hydraulic.

In connection with the Roslin extension, I may say that, owing to the abnormal costs of all necessary material, the village has not been developed as a consumer to the extent upon which I calculated, and it has consequently not been a financially successful undertaking up to the present. In making up the original estimates and deductions as to the potentialities, there was one item which I did not take into consideration, and which I would like to bring to your notice, if only to put on their guard engineers who may be contemplating similar extensions—I refer to the subject of taxation on pipe valuation and wayleaves. It is rather galling to find, after a job of this sort has been completed as a public benefit, and at considerable expense, that the assessor of the district and the rating authorities clap on an annual burden of taxation on the value, irrespective of whether the installation is a paying concern or not. However, I have confidence that this extension will develop profitably after the war.

In the matter of gas supply for motor traction, I may mention that I have also had occasion to note how badly off most of the smaller towns and villages are compared with large industrial centres in giving a gas supply. We in Penicuik have for the past six months been supplying gas to the Scottish Motor Transport Company to buses plying there from Edinburgh. In order that a good supply may be given, I ran a special 4-in. main off a 6-in. trunk main for their use, but when gas is being drawn during the lighting hours the effect is to diminish the pressure slightly over a considerable area of our supply, and to give a consequent slight diminution in the light during the period the bus containers are being filled. This will not be so in towns where mains and distributing systems are large and adequate.

CENTRALIZATION AND AMALGAMATION OF GAS-WORKS.

At last year's meeting of the Association, a considerable amount of discussion took place on centralization. I am sorry to note that nothing has been done during the year to bring this subject to fruition. I am fairly convinced that centralization is bound to come; but, as in other matters left in abeyance, the question is who should take the initiative in such a matter. We have a National Gas Council and we have a Scottish Gas Council; but neither of these seems to possess the authority of a mandate to suggest a scheme. I feel that, if anything is to come of this question, it should be for the managers and owners of the larger gas undertakings in each centre to approach the smaller ones in their adjacent district to amalgamate with a view to absorption. The public will benefit by centralization, and many struggling industries in the smaller towns and villages may be fostered in their sphere of usefulness if given a plentiful supply of good and cheap gas. This may ultimately tend to lessen the congestion in our industrial cities. No doubt little can be done at present to carry such a scheme into practice; but I should like to see preliminary overtures and schemes formulated.

A GAS MANAGERS' TRADE UNION.

The subject of forming a union among gas managers has been mooted for some time back through correspondence in our Technical Press; but it appears that nothing is likely to come of it. Unless such a union were to embrace all gas engineers and managers, it would be of little good, and might only result in additional hardship to managers of the smaller works, who are at present under-remunerated. It is true that mine managers have materially benefited by unifying themselves into a strong position. But their position is secured to them by their holding legalized certificates in mining, and in the event of their withdrawing their services, such positions could not be filled at random. Taken all over, I consider that the gas profession is fairly well remunerated, and the really deserving man is invariably both appreciated and recompensed.

There is room, however, for more unity among gas engineers and managers in the way of greater sociability and kinship, which has decreased instead of increasing during the past twenty years. This would be better than a bickering union having for its motive the monetary betterment of its members, which would cause ever-increasing discontent and discord between capital and labour.

DISCUSSION.

Mr. ALEX. MASTERTON (Edinburgh) said he was glad to see that Mr. Richmond predicted a bright future for the utilization of gas for motor traction purposes. As in Edinburgh they had derived great benefit from this somewhat recent innovation, he could heartily endorse the recommendation that this outlet for gas should be given as much encouragement as possible. Owing to the heavy initial cost of the gas-containers, and the continual wear and tear, he was inclined to the opinion that eventually gas under pressure would be the favourite for traction purposes. On the subject of tar, he thought the President's remarks were somewhat onesided. It was only fair to consider the question from the point of view of the tar distiller. They all knew that from tar there resulted about 60 to 70 p.ct. of pitch, and that since the outbreak of hostilities this commodity had been almost unsaleable. Manufacturers had to store it at great expense and risk, with a corresponding shrinkage in capital. The price of pitch was 50 p.ct. less than in pre-war times. Mr. Richmond's observations on the advantages and disadvantages of low-quality gas would prove most instructive. He questioned very much if they would return to the manufacture of high-quality gas, since their experience with low-grade gas had proved that they could obtain better results so far as bye-products were concerned. The reference to the use of oxide from the ironstone workings was particularly interesting at a time like the present, owing to the shortage of suitable purifying material. He feared, however, that the quantity available would be so small that its adoption would be confined to the smaller works. He had had some laboratory experiments carried out with the same material. It had been found very active in its properties; and the results were excellent. Mr. Richmond's analysis showed a greater amount of $Fe_2O_3H_2O$ than they had obtained; and he would like to say that the President's details added up to more than 100. He made it 110·46. He was somewhat sceptical as to the elimination of carbonic oxide by the material, as Mr. Richmond's analysis only showed 1·98 of lime, while in the sample they had tested no lime at all was obtained.

Mr. DAVID VASS (Perth) said that, in regard to the rating of a new district for mains, he thought the President had surely been taken in by the Assessor. As far as he understood, the Assessor was bound first of all to find the rateable value of the whole undertaking, and then allocate it over the whole area supplied. Any increase into one district should not affect the total rating. Rating was merely a reflex of profit-making; and profit-earning had not been changed by the fact that the mains had been extended. They would find there were law cases determining this. Rating for mains came under a special rebate clause. On consulting the authorities, they would find that mains were only rated at 25 p.ct. of their full rateable value. The subject of charging meter-hire was an old story brought up again. They should not charge for the machine that weighed out the material. Gas-works might as well divide up their plant, and charge the consumer on the capital value of it. With stoves, there was a little dubiety as to whether or not hire charges were reasonable. They, however, were an extra, and not a necessity in gas departments; and one person's requirements might vary from those of his neighbour. The way he argued it out with a gas company was that his meter-hire was only equal to ½d. per 1000 c.ft., and that he would do better to get this ½d. direct, and so do away with a great deal of heart-burning over the meter-hire. With reference to the oxide, the President was to be complimented on getting at a new source, because they had great difficulty in securing such material at the present time. The reason of the back-pressure which had been mentioned in the paper was no doubt the increased volume. Mr. Richmond would be behind the times if he did not introduce a certain amount of revivifying *in situ*. Very few managers would consistently add air in the quantity required for purifying gas. Of course, in purifying with air they had to bear in mind that a certain amount of nitrogen was not absorbed. But the proportion of air for purifying was something like 3 p.ct.; and the proportion of nitrogen in this case was small. The saving of labour more than compensated for the percentage of nitrogen in the gas. The cheaper they produced gas, the cheaper they must sell it. The figures given by Mr. Richmond as to the quantity of air in the comparison of gases of 450 and 650 B.Th.U. scarcely corresponded with those once quoted in the "GAS JOURNAL." When they took into account the volume of air used in the one, as compared with the other, along with the effect in cooling the gas, they narrowed down the difference to vanishing-point; and they found in practice that there was really an advantage in giving the gas of 450 B Th.U., as compared with one 150 B.Th.U. better. There was more trouble in the case of gas-engines with the higher than with the lower quality. In the lower grade, with less air and more gas, they had a sharper explosion. In these days of scarce coal, the thing was to get as much out of a ton as possible. There was another feature in the higher yield of gas. The higher yield was best obtained by a heavier charge in the retorts; and there was, in addition, more ammonia. He was working with twelve-hour charges and full retorts—12 cwt. When working with 8 cwt. charges and three-quarter-filled retorts, he had a poorer result, both as to yield of gas and yield of ammonia. The higher yield now was due to the fact that there was less of the hot-air space in the retort, which reacted upon the gas.

Mr. T. F. SUTHERLAND (Managing Director of Messrs. Ross & Co., chemical manufacturers, of Falkirk), called upon to speak on the tar question, said there had been a certain atmosphere created in which the tar distillers had been represented as reaping great benefit from gas companies owing to the war. This was not the case, so far as his firm was concerned. It was a very distressing point that, when everything else was increasing in value, tar should have been halved. Mr. Masterton had put in a word for them, saying that 5·7 p.ct. of the tar was pitch. The present value of this pitch was somewhere between 1¼d. and 1½d. per gallon; and they had had to store large quantities. Incidentally, their firm had spent several thousands of pounds in making arrangements to handle and store pitch, while at the same time keeping the works going, as they considered it their duty to help the gas companies. They need not have gone to this expense. In the case of sulphate of ammonia, the price had, of course, advanced a few pounds over pre-war price rates; and the cost had also gone up. The advances, in fact, almost balanced each other. They had had added to their railway carriage at least 100 p.ct.—and in some cases more. He did not think that anyone could expect the price of tar liquor to be more than in pre-war times, if these figures were correct. At a meeting with one or two members of the gas industry on the preceding day, with reference to the feeling that the firm had made excessive profits out of the war, he asked them to take up the matter with the firm's auditors; and if they were not satisfied, he was quite willing to go before a neutral auditor or arbitrator. He also offered to have the books examined over the last twenty years by a neutral person. There was no ground for the present feeling.

Mr. J. D. KEILLOR (Hawick) said that, notwithstanding the contentions of Mr. Sutherland, the gas managers had only been half alive to the value of tar. It had been suggested that they should co-operate; and this was one of the many matters over which the industry had procrastinated. They were all, of course, looking forward to deriving some benefit from the conversations at present proceeding between the distillers and the Scottish Gas Council; but, even with this, he did not think it advisable to drop the President's suggestion. The idea was as old as distillation itself. Why should they consider the tar distillers? They had, as a matter of fact, little or no interest in the gas industry, beyond the profits they made out of their crude products—profits which should not go out of the industry. They had the remedy at hand, if they became alive to-day. Let every gas manager

say he was prepared to back-up a scheme of co-operation, and something tangible would take place. Coke had not been a drug in the poorer districts; and prices had had an upward tendency since 1914. It was certainly peculiar that the Government had not insisted more upon the use of coke as a substitute for coal. There was, undoubtedly, a very great future before gas for motor propulsion; but, in his opinion, the gas-works of the future must not only be in a position to supply gas for all purposes, but they must also have the necessary oil fuel on tap. When they remembered that the present wastage in bye-products from coal was greater than the world's output of gold, there was a prospect of development before them the like of which had never been known. The Gas Councils, both National and Scottish, would have to look alive. Such trivial matters as meter-rents, stove-rents, demands of deposits, and the binding of gas users by regulations, were much too tyrannical, and should be abolished.

Mr. JAMES DICKSON (Johnstone) was not surprised that the tar note should have been struck. It was becoming a thorn in the flesh to them to think that, in spite of their coal costs going up, along with their wages costs, tar prices showed so much reduction. They were pleased to hear Mr. Sutherland, who had done well for them in the past—and for himself; but they did not want him to do better than he had been doing for the past two years. The fact of the matter was that it would really drive them to tar distillation, if their prices did not rise to pre-war levels. He had been forced to tar distillation in a small way, and might be prepared to do it on a larger scale. The figures given by Mr. Richmond in regard to British thermal units and the make per ton were interesting; but they did not go far enough. The British thermal units delivered per ton of coal carbonized would be more and more the standard upon which they would work in the future.

Mr. R. W. COWIE (Hon. Secretary) asked Mr. Richmond what he thought a reasonable profit for a gas company. The President had spoken of profiteering by Scottish gas companies; but he (Mr. Cowie) did not know of any companies who could be accused of this; though he knew of many who had been badly hit through being statutory concerns. It had often been argued in his presence that it was advisable to become a statutory company; but those in that position found themselves in difficulties at the present time. In these days, when coal was becoming so scarce, and it was difficult to get up stocks, those who had horizontal retorts might follow the lead of those with verticals in regard to steaming. He had been trying it for a week or two, with very fine results. It was quite easy to get 12,000 c.ft. per ton, and more, according to the number of retorts steaming. He was led to make the experiment after reading an article on the subject. With one bed of retorts just now, he was saving 7 cwt. of coal every day. He was not only getting a higher make, but a greater yield of ammonia, and could recommend the process to everyone. They heard much about the centralization and amalgamation of electrical undertakings. There was no doubt that, if the gas industry was to succeed, a similar amalgamation must take place. It was ridiculous that, scattered over the country, there should be so many units making gas, when a large one near the coal-pits could do the work so much cheaper. To introduce the steam pipe, a 1¼-in. hole was bored in the retort lid. When the pipe was not in, the hole was plugged-up. A heavy six-hour charge was put in; and when it was completely burned off, the plug was taken out and a ¾-in iron pipe, with holes bored on either side, and closed on the top, was inserted up to the back of the retort. He had a ¾-in. steel couple and washer to make a conical joint, with asbestos card. With the pipe in, the steam was turned on. With thirteen retorts he could make as much gas, steaming for six hours, as with sixteen charges and no steam. It was so simple that anyone could do it. The steam pressure was 20 to 30 lbs.

Mr. KEILLOR said he had been in communication with the Devon Gas Association on the subject, and had also been experimenting. He was not yet at liberty to describe anything about the method; but there was no doubt it was an unqualified success. They had no difficulty in doubling their make per ton; and they would save thousands of pounds a year. As a matter of fact, the arrangement was entirely different from that of Mr. Cowie; but until the inventor had his patent carried through, no explanation could be made.

Mr. RICHMOND, replying to the discussion, said he believed Edinburgh would be selling 200 million c.ft. of gas per annum for motor traction alone. They in Penicuik had had their output increased by 5 million c.ft. by this means. As for the comparison of Penicuik gas with that of Edinburgh, a container filled with the former would take a bus from Penicuik to Edinburgh and back; but with Edinburgh gas they could not run to Penicuik and return. This in itself showed that the quality was better. The Scottish Motor Traction Company got gas from Rosewell, where cannel coal was used. It was a real, rich, genuine coal gas. The traction inspector said that it was just like gunpowder, compared with Edinburgh gas. The relative values of gases were factors which undoubtedly should be taken into consideration by motor users. There were, of course, two sides to the tar question; but though Mr. Sutherland's statement seemed to be fair, he could not get over the fact that for years there had been no competitive offers for their tar. In regard to the remarks of Mr. Vass, he might say that he had carried out for many years revivification *in situ*, and had only stopped it recently. In Penicuik, they supplied about 25 p.ct. of gas for lighting purposes with flat-flame burners. His grievance regarding meters was that in connection with smaller works there were in houses a considerable number of meters standing unused. If they were to impose meter-rents, it would be a fair way of dealing, and they might get a considerable number of unused meters returned. He would like the Board of Trade to put to him the question asked by Mr. Cowie, with regard to a reasonable profit for a gas-works. If it were good enough for the Government to pay 5 p.ct., it was good enough also for a gas company.

Mr. Alex. Bishop, of Newtongrange, was elected President for the ensuing year; Mr. R. W. Cowie was re-appointed Secretary; and Mr. J. D. Keillor was re-elected to the Committee—the following filling the places of retiring members: Mr. R. J. Philp (North Berwick), Mr. Peter Blair (Haddington), and Mr. W. Easson (Jedburgh).

The company afterwards sat down to dinner; and later in the afternoon, by invitation of Mr. W. J. Thomson, the General Manager of the Scottish Motor Traction Company, they were conveyed to the extensive works at Fountain Bridge, for a visit of inspection.

ISLE OF WIGHT GAS ASSOCIATION.

The Fourteenth Annual Meeting of the Association was held last Wednesday, at the works of the Ventnor Gas and Water Company—Mr. J. S. INESON (Ventnor) in the chair. The members were, on arrival, heartily welcomed by Mr. V. G. Middleton, the Chairman of the Company.

Mr. INESON, in the course of a short address, summarized the difficulties under which the Island Companies had laboured during the war—shortage of labour, trouble in obtaining coal supplies, and high prices of freights, coupled with the difficulty of obtaining shipping. The old and new gas rationing schemes were also dealt with by him.

A hearty vote of thanks was passed to Mr. Ineson for his address, and for the able manner in which he had carried out his duties as Chairman during the past year.

Mr. F. C. Taylor (Shanklin) was elected Chairman for the present year, and Mr. H. W. Falkner (Sandown) Deputy-Chairman. Mr. S. W. Ibbotson (Newport) was again elected Hon. Secretary and Treasurer; and Mr. Frank King, Hon. Auditor.

A donation of three guineas was voted to the Benevolent Fund of the Institution of Gas Engineers, and two guineas to the British Commercial Gas Association.

Tea was afterwards served in Mr. Ineson's garden; and a vote of thanks to Mr. and Mrs. Ineson for their kind hospitality brought to a conclusion a highly successful meeting.

THE ROMANCE OF PETROLEUM.

Lecturing before the Royal Institution, last Friday week, on the "Romance of Petroleum," Sir BOVERTON REDWOOD, Bart., D.Sc., recalled that in 1815 John Taylor was granted a patent for a process described as producing "inflammable air or olefiant gas applicable to the purposes of giving light" from vegetable or animal oil, fat, bitumen, or resin. This oil gas, compressed by a method patented by Gordon and Heard in 1819, was supplied by a company having the title of the London Portable Gas Company. It was contained in vessels having a capacity of 2 c.ft., which were delivered to the premises of consumers, and retured when empty to be refilled. The liquid which separated when the gas was compressed into these cylinders was that which Faraday examined. It is, he said, not reasonable to assume that, while he was ascertaining the chemical constitution and properties of what was actually synthetic petroleum, Faraday can have realized the importance of the part destined to be played by these hydrocarbons in peace and in war. Nevertheless, his extended reference to what he describes as the remarkable action of sulphuric acid upon the compounds of carbon and hydrogen which he had isolated, and his subsequent paper on the mutual action of sulphuric acid and naphthalene, appear to indicate that he may have had an intuitive perception of the valuable industrial developments in the manufacture of dyes, which after many years followed his classic researches. In the same year, Faraday also published the results of his examination of caoutchouc, and showed that this substance is mainly a compound of carbon and hydrogen. Eleven years later, Edmund Davy, a cousin of Sir Humphry Davy, discovered the gaseous hydrocarbon which we now know as acetylene. The account of his discovery which he gave at the meeting of the British Association in 1836 was as follows: "Early in the present year the author, in attempting to procure potassium, by strongly heating a mixture of calcined tartar and charcoal in a large iron bottle, obtained a black substance which readily decomposed water and yielded a gas which, on examination, proved to be a new compound of carbon and hydrogen."

After dealing with the origin of petroleum, the lecturer went on to quote the world's output for last year as being estimated at approximately 70,403,128 metric tons. The predominant contributor is the United States; the oil-producing countries of the British Empire furnishing only 2 p.ct. of the total given. Under these conditions, he added, the British Government are to be congratulated upon having secured the control of the exceptionally prolific oil-fields of Persia.

In the British Isles there is a flourishing industry in the mining and distillation of Scottish shales as a source of mineral oil and ammonia. This industry owes its existence to James Young, of Kelty. In the year 1847 Young's attention was directed by Playfair to a stream of oil flowing from the top of a coal-working at Alfreton, in Derbyshire. From this oil he succeeded in extracting on a commercial scale, paraffin-wax, lubricating-oil, and burning-oil. The supply of the raw material being soon exhausted, Young attempted to imitate the natural processes by which he believed the oil to have been produced, by the action of gentle heat on coal; and in 1850 the made his invention the subject of his celebrated patent for "obtaining paraffine oil, or an oil containing paraffine, and paraffine from bituminous coals by slow distillation. The process was extensively carried out in the

United States, under licence from Young, until crude petroleum was produced in that country in such abundance, and at so low a cost, that the distillation of bituminous minerals became unprofitable. In consequence of the approaching exhaustion of the oil-fields of the United States, attention is now being actively given to the utilization as a source of oil of the immense deposits of bituminous shales known to exist in that country.

For many years there was an actual output of petroleum in this country recorded in the General Report and Statistics relating to Mines and Quarries in the United Kingdom, issued by the Home Office. Since 1906, however, no output has been stated. Apart from the production referred to, there have been discoveries of oil in this country from time to time, some of which were of a very doubtful character. An interesting occurrence of free petroleum was brought to his notice in 1892. It took the form of a sudden influx of some hundreds of gallons of light-coloured oil into a well which was the source of the water-supply of an isolated dwelling-house standing on high ground near Shepton Mallet. Another case, which is certainly genuine, is that of the oil-find in a test-boring made for coal at Kelham, near Newark. From this bore-hole, which at a depth of something between 2400 and 2500 ft. had penetrated a bed of porous sandstone, a flow of characteristic crude petroleum that amounted to some 5 or 6 gallons a day took place. The much-advertised discovery at Ramsey, near Huntingdon, cannot be included in the same category, for the oil had unquestionably leaked from an adjacent store.

It may be confidently asserted that in certain parts of Great Britain the geological conditions are consistent with the existence of valuable stores of petroleum; but doubt has been expressed as to whether the drilling operations which the Government have decided to undertake will be attended with success. It is, however, admitted that the only conclusive test is that of the drill. Some months ago Lord Cowdray publicly announced his belief that oil may be found in commercial quantities in Great Britain, and stated that his firm were prepared to spend £500,000 on exploration and development, if certain areas were reserved to them. Even if we should be unsuccessful in finding free oil, we know that we have abundant stores of bituminous minerals from which oil can be obtained by destructive distillation.

NEW SOUTH WALES AND QUEENSLAND GAS INSTITUTE.

THIRD ANNUAL MEETING IN SYDNEY.

A successful conference of the Institute was held in the Royal Society's rooms, Sydney, on March 12—a later date than usual, consequent upon the industrial upheaval towards the end of 1917. The President was Mr. A. WILSON, the Engineer to the Australian Gas Light Company. Two papers were read, and there was a "Question Box." On the following day, the members were the guests of the Directors of the Australian Gas Light Company, and had an opportunity of inspecting the Mortlake works, where they took luncheon and tea. They also visited the Oyster Cove works of the North Shore Gas Company.

REPORT OF THE COUNCIL.

Reporting on the year ended Sept. 30, 1917, the Council stated that there was a membership roll of fifty. During the year, the Council discussed the rules governing the fitting-up of premises and the fixing of meters, also the regulations for the examination and licensing of gas-fitters. These rules have now been printed. Special attention was given to the subject of the method of showing income-tax in the form of accounts provided by the Gas Act, 1912. As no nominations had been received for office-bearers and members of Council for the ensuing year, the Council nominated the following:

President.—Mr. J. C. Alexander.
Vice-President.—Mr. J. Mackenzie.
Hon. Treasurer.—Mr. S. J. Janes.
Hon. Secretary.—Mr. H. Tindale.
Members of Council.—Messrs. J. M'Auliffe, A. G. Ambrose, and T. F. Waugh.
Auditors.—Messrs. E. Foster and A. H. Smedley.

PRESIDENTIAL ADDRESS.

Mr. WILSON, after thanking the members for electing him President, said—

In looking back upon the period during which I have held office, three facts stand out pre-eminent, and must influence any remarks I may make. These facts are: The existence of a state of war. The spirit of unrest which possessed the Australian workmen, and which culminated in the recent regrettable industrial upheaval. The passing into law of the Gas Amendment Act. These three factors will individually leave greater marks upon the history of the gas industry in Australia than any previously recorded, and, as such, are worthy of our attention.

This great war, which burst upon the world with startling suddenness in 1914, found the gas industry in Australia in a peculiar state of unpreparedness—in fact, it could be likened to a child which had not so far been freed from its mother's apron strings. Accustomed from its birth to depend upon the parent industry in the Old Country for a lead in all things—to look to the Old Country for supplies of plant and materials, and generally to rely upon her—bred up in the industry a sense of security and well-being which in some things amounted almost to inertness. That there may have been some excuse for this state of things, I am prepared to admit when I remember that in such a young and rapidly growing country as Australia it required all the efforts of those responsible for the conduct of the undertakings in the industry to cope with an ever and rapidly increasing demand for gas, and that the reliance which could be placed upon the Old Country made it possible for these efforts to be concentrated. This sense of security received a rude awakening when, shortly after the outbreak of hostilities, it was borne in upon us that England had other and more important work to do than to cater for the needs of the gas industry in Australia, and that it was, as our American cousins and allies say, "up to us" to walk alone.

GAS PLANT MANUFACTURE IN THE COMMONWEALTH.

Such a drastic upsetting of conditions left the industry for some little time in a state of indecision. But, with the spirit which peculiarly fits the British race as colonists, it soon grappled with the problem, and that successfully. The knowledge that we could help the Empire by helping ourselves proved incentive enough and was loyally responded to by Australian manufacturers. The manufacture of plant and machinery, hitherto unattempted in Australia, has been embarked upon with commendable success. Firms whose efforts had previously been confined to special lines had been induced to launch out in other directions when the needs of the industry have been pointed out to them, and new industries are springing up every day. The opening of the steel works of the Broken Hill Proprietary marks an epoch in the manufacturing history of Australia, and is the finest example of the awakening of the country to its future needs. A spirit of alertness permeates our business atmosphere, and Australia may now be said to be fully awake and to have attained full manhood. Examples of the work now being performed locally may not be amiss, as showing the resourcefulness of the country. Conveyors, grabs, cranes, boilers, locomotives, scrubbers, washers, valves, purifiers, and gasholders have, since the outbreak of war, been successfully constructed; and no fear need be felt that the progress of the industry will be hampered by want of plant. To this satisfactory state of affairs the "gasman" has contributed, having, out of his love for the Empire, assumed his share of the burden by, among other things, undertaking the work of teaching the manufacturer how best to fill the requirements of the industry, responding to the demand for munitions, and cheerfully displaying an adaptability and resourcefulness previously unrevealed.

TOLUOL PRODUCTION.

Since our last meeting, the fiat has gone forth that the use of crude tar is prohibited in all the large centres of Australia; the object being to conserve ingredients of tar that are so urgently required for munitions purposes. So heartily did those in charge of gas undertakings comply with the decree that to-day every gallon of tar produced in these centres is denuded of its toluol and benzol; and these products are available for the service of the Empire. Were the subject not one of such vital importance, considerable mirth might be occasioned by an inspection of the makeshifts which have had to be resorted to in the endeavours to comply with the decree and to loyally and urgently help in the cause of Liberty. As it is, only praise for the resourcefulness in many instances displayed, is merited; and the industry is to be congratulated on being awake to the necessity for urgent and concerted action on the Empire's behalf.

OVERCOMING THE SHORTAGE OF METERS.

As an example of the straits to which this state of war has driven my own Company, we have decided, owing to our inability to obtain meters, or even certain of the necessary materials for the manufacture of them, to institute a flat-rate for the sale of gas, and thereby remove an obstacle which has lately been impeding the progress of the industry. "History repeats itself," as, for the first ten years of my Company's existence, gas was invariably so sold.

AUSTRALIAN MADE VERTICALS.

The failure to secure shipment of the balance of the materials required to complete the second large installation of vertical retorts at our Mortlake works necessitated their manufacture locally.

This has now been done; and the work reflects great credit on all concerned, being of as good a quality as that it substitutes. To-day all classes of engineering work required in connection with a gas-works are being performed at our Mortlake works, including even the working-up of scrap into bars and shafting, with excellent results. Large extensions of the telpher plant for handling coal and coke have been completely and successfully carried out in our own works, which are every day becoming more self-supporting and independent of outside help. The war, while it found Australia unprepared, has been instrumental in awaking her to a certain sense of responsibility, though one could wish she more fully recognized it.

THE GAS INDUSTRY AND THE CALL FOR MEN.

I feel that I cannot leave the subject of the war without referring to the response which the members of the gas industry have made to the call of the Empire for men, and to the sacrifice which many individual members have made. Out of the employees of my own Company, 319 have volunteered and been accepted. Of these, 251 are still fighting; 37 have returned to our employ—battered and war-worn, but still playing a man's part; and 31 have made the great sacrifice, yielding their lives in the cause of Liberty and the greater "Light." When it is remembered that Australia is far removed from the seat of war, that its strife is only faintly heard, and that these men were volunteers, one feels proud of the industry, and is inclined to think that its atmosphere is conducive to loyalty.

LABOUR UNREST IN NEW SOUTH WALES.

The spirit of unrest which is abroad in the world, which has led nations to destruction and has resulted in revolutions and the overthrow of dynasties, has to a minor extent lately found an echo in New South Wales. The democratic proclivities of the Australian worker proved fertile ground for the seed of unrest which fell there; and certain unruly and misguided spirits watered and tended the seed with such success that, in August of last year, it blossomed and brought forth fruit in the shape of a general strike and most complete dislocation of business. Owing to the success attending previous minor outbursts of this nature, and to a misguided belief in the infallibility of such methods of expression and in the strength of unionism, the Australian worker hailed the occasion as the dawn of a democratic millennium. He was led into participating therein by a mistaken sense of loyalty—the result of parochialism and far-removal from the seat of war—deaf to the need of the greater loyalty. The pity of it! as no more loyal subject of the Empire exists than the true Australian worker. Fortunately for New South Wales, for Australia, and, I verily believe, for the Empire, the Government in power was composed of men who were fully alive to the danger of allowing this power to pass into the hands of men irresponsible, and with views narrow and stultified—men perhaps honest in their own mistaken way, but totally unfitted to wield the power. The Government executed a master-stroke by appealing to those right thinking subjects whose views were clear and unobscured by any issue less vital than that of the Empire's needs. In their thousands, these men came at the call—men of the open country, men of single purpose, uncontaminated by any mistaken idea of loyalty to a party or to the fetish of unionism. The great public services which had been thrown partly, if not wholly, idle were immediately manned by these men, who at once showed the stuff of which they were made—showed their adaptability to conditions that hitherto were foreign to them; and the wheels of industry began to revolve more and more quickly till normal conditions were again attained. What was practically a revolution was thus quietly, but determinedly, "squashed"—and that bloodlessly.

As an object lesson, the strike of 1917 is perhaps the greatest yet granted to Australia out of her own experience, teaching as it does the strength and reliance to be placed upon the "man on the land"—the backbone of the country—and breaking down once and for all the claim, fostered of late years by the unions, that all labour is specialized, and should be recognized and paid for as such. The close corporations of unions of various trades and callings received a rude shock when they discovered that the work usually performed by their members could be well done by men of inexperience but intelligence.

From my own experience, I cannot speak too highly of the work performed by these "Loyalists," living, as I did, for six weeks in close contact with them and their work. When our own workmen went out on strike from a mistaken sense of loyalty to a cause unworthy of the name, and by so doing hoped to strike a decisive blow by plunging the city into darkness, our efforts were at once concentrated on our larger works at Mortlake. Owing to the previous cutting-off of the supply of coal, the manufacture of gas was then on a reduced scale—restrictions as to its use having for some time been in force. Within two hours of our workmen leaving the works, between 200 and 300 loyalists were on the scene clamouring to help. By the evening of that day, a camp, which eventually accommodated over six hundred men and was replete with every convenience, was established on the works. It is unnecessary to go into details as to the breaking-in of these men, or as to the organization which achieved victory—suffice it to say that, thanks to the enthusiasm, intelligence, and energy displayed by these men, to the comradeship existing between master and man, and to the spirit of loyalty imbuing all, victory was achieved. The supply of gas never failed, but was day by day increased and eventually resumed in whole.

It is worth mentioning that the routine work of the vertical retorts was never interrupted, or even delayed for five minutes, during the whole of this anxious period. They were operated wholly by unskilled labour, and proved a wonderful factor in saving the situation. The horizontal retorts and carburetted water-gas plants, which perforce had to be closed-down, were gradually recommissioned; and as a proof of the intelligence displayed by the men who came to our assistance, efficient carburetted water-gas operators were trained in three days.

From the discharging of coal from the colliers to the boosting of gas from the works, with few exceptions the whole labour was performed by men totally inexperienced, the bulk of whom had never seen a gas-works before. I look back with more than pleasure to my association with these men, feeling that I am the gainer by it, in having impressed upon me the happiness and content to be derived from the doing of hard work of no matter what nature, and the virtue that lies in honesty of purpose. The lesson to be derived from the strike is one which applies equally to employer and employee—and that is that only through a spirit of tolerance and trust, combined with a proper conception of duty and a desire to fulfil it, can prosperity really be attained.

THE WORKING OF THE NEW GAS ACT.

When the Gas Act of 1912 was passed into law, it was looked upon by the then Government responsible for its passing as an earnest attempt to regulate the supply of a necessary commodity and, in the case of certain companies, of the dividends to be derived from the sale of such. To the clauses of the Act dealing with other than financial matters no exception could be taken, as it was recognized that certain standards of purity and quality were necessary; and their operation has entailed no great hardship on suppliers. The same, however, cannot be said of the other clauses dealing with dividends and selling price, as they in themselves constituted an act of spoliation. Purporting to be based upon British legislation, the Gas Act in reality fell far short of it, as one vital principle was departed from. When the Act was passed, the standard price of gas by which dividends were to be regulated, was, without inquiry, fixed at a figure much below the then existing selling price, though in England without exception a full inquiry is always made, and the standard price fixed at a figure which leaves a considerable margin for contingencies. The result of this low standard price was an immediate reduction of the dividends, and, owing to the operation of the sliding-scale clause and the continued increase in the selling price due to increases in the cost of production, these dividends have fallen lower and lower. The natural corollary of this fall in dividends has been the fall in the market value of gas shares and the suspicion of investors about investments in gas undertakings. Of late, it has been impossible to induce fresh capital into these concerns—the direct result of parliamentary interference.

The operation of the sliding-scale, while it has proved equitable in England under normal conditions, has proved the reverse in Australia, where conditions are in a constant state of change, and where, even prior to the outbreak of war, the cost of wages and materials was constantly increasing. That this upward tendency was recognized by Parliament in 1912 is evident, as provision was made in the Gas Act for increasing the standard price correspondingly with an increase in wages. No provision was made for increasing the standard price by reason of increased costs of materials—Parliament overlooking the fact that such costs must increase as wages increased; and this omission, combined with the low initial standard price, has been almost disastrous.

So acute did the position become that the three Companies named in the schedule to the Act, and to whom the financial clauses apply, were forced to seek redress from Parliament; and the Government was approached with the view of obtaining relief. The urgent necessity for relief from the operations of these strangling clauses if the Companies were to be placed in a position to enable them to obtain further capital for the fulfilment of their obligations was pointed out to the Government, who undertook to bring forward a Bill to amend the Gas Act of 1912. This Bill has now received the approval of Parliament; and while it does not place the Companies in the position they occupied prior to the passing of the Act, it affords some measure of relief.

The standard price, which in 1912 was fixed below the then existing selling price, remains in the schedule; but all increases in the cost of production, whether due to wages or materials, since the passing of the original Act, may, after inquiry, be added to the price, and a new standard price created. Provision is also made for a revision of the standard price from time to time, should the minister in charge of the operation of the Act think it necessary. As a return for this co-called concession, the Companies concerned will in future have to be content with a maximum dividend, if earned, of 8 p ct. instead of 10 p.ct. as allowed by the original Act. Better provision is allowed to be made for depreciation; 3½ p.ct. per annum being permitted to be set aside to be drawn upon as required, as against what was equivalent to 1 p.ct. in the case of my own Company. The fund to which this annual contribution may be made has to serve a double purpose—viz., replacements and contingencies. To those who know what replacements are required in a gas-works, and what enormous expense a strike may entail, the provision named may not seem enough.

In a piece of modern gas legislation such as this, one is at once struck by the retention of the obsolete candle power standard. For this retrograde step the Companies can scarcely be held responsible; their energies having had to be devoted to the improvement of their financial positions.

Taking the Amending Act as a whole, it may be said to be a legitimate attempt, made under difficult and unfavourable conditions, to right a wrong created by the original Act; and it may also be said to have in some measure succeeded, though to what extent time alone will show.

CONCLUSION.

Reviewing the past year or two, which have been momentous from the point of view of Industrial Australia, one cannot help coming to the conclusion that, granted a happy termination to this awful war, for which we all pray, a new and a more prosperous era is dawning, which, out of her loyalty, Australia will hail with enthusiasm and will prove herself a worthy scion of a worthy race.

EXPERIENCE AT FORBES.

By J. W. BARDSLEY, of Forbes, N.S.W.

This was an account of four months' experience in the management of the Forbes Municipal Gas-Works.

Mr. Bardsley, who was at the time managing the Wellington (N.S.W.) Gas-Works, upon being appointed to Forbes, at once made an inspection, which resulted as follows: Three arches, two settings of four and another of three retorts, dimensions 22½ in. by 15 in. by 9 ft. 3 in., direct fired; one setting of four retorts in pieces, and not workable, leaving seven retorts in action, the four setting old and very dilapidated. The continous hydraulic main and the exhauster occasionally drawing air at the dip-pipes on the bench out of action. A 6-in. foul main, gas-engine driven rotary exhauster with governor and butterfly valve, governor and valve out of adjustment, and working very unsatisfactorily. Six-inch condensers with bye-pass, tower-scrubber with bye-pass, two purifiers, 6 ft. 6 in. by 6 ft. 6 in. by 4 ft. deep, with Donkin valves, station meter with bye-pass, *minus* water-line tubes and overflow, and creaking like an old mill wheel, the water being heavily saturated with ammonia. The capacity of the holder was 60,000 c.ft. An inferential photometer was connected on the inlet to the holder, and no photometer on the outlet. There was a 6-in. governor on the outlet; but it only worked when forced to do so by man-power. There were six broken 3-in. mains, and several service-pipes rusted through. Some of these were wrapped up with rubber tape and rag, but leaking. The output was 45,000 c.ft. per day, and July and August to go through with the seven retorts. So it was a time for action, not words.

Broken mains were repaired with split collars, and services attended to. Then a retort in the "four" bench became unworkable; and to patch it satisfactorily he had to fill up between two of the transverse walls to stop a hole about 12 in. by 12 in. While this was being done, the holder was sinking; and he was compelled to pull the quality down considerably to make quantity. But having removed the photometer to the outlet of the holder, he had no fear.

The stock of coal was very low, and only small lots coming to hand. They were just keeping the holder from settling down when the strike was declared on; and the stock of coal was 20 tons 13 cwt. He at once started on sawdust from the sawmill, and sent carters out to get wood, having to be satisfied with redgum. He cleaned up the town of coal, and had been running about 70 p.ct. of wood gas to the balance of coal gas, but had to come lower still. As the photometer was useless for testing this gas, he fitted-up an ordinary incandescent burner, and watched the heating qualities of the gas on the mantle. By this test, he was sure of the explosive force for engines and heating in gas-stoves. But at last he ran out of coal, and he had to study the gas produced by the wood for quality. He had to reduce the duration of the charges, until at last he was only giving two-and-a-half hours per charge. This made the best quality he could obtain from the wood procurable. Altogether, they were without coal for thirteen days. The greatest trouble during this time was the tendency to foul in the hydraulic main; but he got over this by repeated flushings. There were consumed 35 cords of wood and 9 loads of sawdust. The cost was 18s. per cord; and he obtained fully 9000 c.ft. per cord. The residue from the wood was sold to the blacksmiths at 1s. 6d. per bag, and was a very good charcoal.

NOTES ON OXIDE PURIFICATION.

By H. TINDALE, of Sydney.

This was a long contribution which, if reproduced *in extenso*, would occupy some ten columns of "JOURNAL" space. The author began by quoting the conditions tending to maintain purifiers at their highest efficiency as summarized in the Chief Alkali Inspector's report for 1915—see "JOURNAL" for Sept. 26, 1916. This was followed by consideration of the oxides of iron of importance to gas engineers and their chemical properties. The effect of ammonia, of cyanogen, of tar and oils, and of oxygen on purification was then dealt with. As to ammonia, Mr. Tindale said:

The part played by ammonia in oxide purification has always been obscure. Experience shows that the efficiency of an oxide is considerably increased when sufficient ammonia is present to maintain the oxide in a neutral or slightly alkaline condition. The life of the oxide can be markedly extended by the supply of a controlled amount of ammonia to the purifier boxes. Recently, it has been shown that the amount of ammonia required to maintain the oxide in a neutral state is directly related to the amount of ferrous sulphate formed. Further, the formation of ferrous sulphate is favoured by excessive moisture, and probably by low temperature. Authorities differ concerning the amount of ammonia necessary to maintain the oxide neutral or alkaline—the amount varying from 0·5 grain to 6·5 grains per 100 c.ft. Though local climatic conditions, as regards temperature, are favourable to purification with oxide of iron, they are distinctly unfavourable to the extraction of ammonia with water. Gas engineers, in New South Wales at any rate, will agree that the removal of ammonia by the usual process of washing with water is far from satisfactory, especially in the summer time. The action of ammonia on brass and gun-metal is well known. The effect is so detrimental that at times considerable expenditure is incurred on the maintenance of consumers' meters and fittings. The effect of ammonia on consumers' meters is, unfortunately, too well known; but what is its effect on oxide purification?

During the past year, special attention has been given to this matter. The investigation is not yet complete; and it is therefore necessary to speak with reserve. The experiments were of a preliminary character, and were all made in the laboratory. Oxide purifiers consisting of glass absorption towers were used. A thermometer was placed in each tower, and the temperature of the oxide recorded from time to time. The oxide was mixed with sawdust in the proportion of one part by volume of oxide to two of sawdust. The mixture was then moistened with water so that it contained 14 p.ct. of water; this amount being constant throughout all tests. Pure sulphuretted hydrogen was passed through the oxide.

In the first experiment, the oxide was sulphided in the absence of ammonia. It was noticed that very little sulphuretted hydrogen was absorbed by the oxide until the temperature of the purifying material was 88° Fahr., which was reached in three hours. The temperature then gradually increased until it reached 120° Fahr. The total time taken to reach the maximum temperature was some 4½ hours.

A fresh sample of oxide was then sulphided in the presence of ammonia. Here, very little sulphuretted hydrogen was absorbed until the oxide temperature was 82° Fahr., which was reached in two hours. The temperature 20 minutes later was 150° Fahr., it then quickly decreased to 100° Fahr.; the total time taken being 2 hours 40 minutes. It was noticed that: (*a*) In the presence of ammonia, the amount of sulphuretted hydrogen absorbed and the temperature of the oxide were greater than in the absence of ammonia. (*b*) That as the temperature of the oxide rose, the ammonia was driven forward. Experiments made with a set of purifiers, consisting of three absorption towers, showed that the ammonia travelled from one purifier to another as the temperature of each purifier increased. On reversing the flow of gas, the ammonia was caused to travel back through the purifier set—*i.e.*, from No. 3 to No. 2, and then from No. 2 to No. 1 absorption tower.

Though it is well known that the reaction of sulphuretted hydrogen and oxide of iron is exothermic—*i.e.*, liberates heat—sufficient attention has not so far been given to the fact that the combination of ammonia and sulphuretted hydrogen, and of ammonia and carbonic acid, in the presence of water, are also exothermic reactions. For instance, the heat of formation of ammonia bicarbonate is about five times greater than that of the heat of formation of ammonium sulphide, and about eight times greater than that of the iron sulphide. Again, the heat of formation of ammonium sulphate is about seven times greater than that of ammonium sulphide and twelve times greater than that of iron sulphide.

Ammonia combines with sulphuretted hydrogen and carbonic acid to form salts, most of them only stable at relatively low temperatures—*i.e.*, up to about 104° Fahr. (40° C.). If the temperature of the purifying material exceeds 104° Fahr.—a condition to be expected in the summer time—decomposition of these ammonium salts takes place, with the result that the sulphuretted hydrogen is driven forward and removed in the succeeding purifiers; but some of the free ammonia and carbonic acid are carried forward into the distributing system.

That such decomposition does take place in practice is illustrated by the following tests, taken at the beginning of the summer season.

—	Ammonia.	Grains per 100 C.Ft.	
Inlet No. 1 Purifier . . .	5·32	7·68	20·94
,, No. 2 Purifier . . .	20·45	53·16	27·40
,, No. 3 Purifier . . .	15·55	19·25	26·10
Outlet	12·13	8·37	24·00

Another series of experiments were undertaken to ascertain the effect of varying amounts of ammonia in oxide of iron during sulphiding. The dry oxide was moistened with dilute ammonia solution, so that the oxide contained 14 p.ct. moisture, and the following percentage by weight of ammonia—0·75 p.ct., 1·25 p.ct., and 2·5 p.ct. The oxide was "fouled" with pure sulphuretted hydrogen in a glass absorption tower. A thermometer was placed in the topmost layer of oxide, and the temperature taken at intervals until the maximum temperature was reached.

All the experiments were undertaken as nearly as possible under identical conditions. The following results were obtained.

Temperature of Oxide of Iron During Sulphiding. Effect of Ammonia.

Time.	Temperature of Oxide at Top of Tower. Percentage of Ammonia in oxide—by weight.			
	No Ammonia.	0·75 p.ct.	1·25 p.ct.	2·50 p.ct.
	° F.	° F.	° F.	° F.
At beginning of experiment	79	81	67	78
10 min.	83	103	67	78
20 min.	83	104	100	79
30 min.	90	130	103	81
40 min.	146	137	100	87
50 min.	167	139	98	94
60 min.	178	195	98	99
1 hr. 10 min.	192	185	109	125
1 hr. 15 min.	160	180	150	128
1 hr. 20 min.	—	—	164	—
1 hr. 25 min.	—	—	165	—
1 hr. 30 min.	—	—	155	135
1 hr. 35 min.	—	—	147	145
1 hr. 45 min.	—	—	—	160
1 hr. 55 min.	—	—	—	197
2 hrs. 10 min.	—	—	—	197
2 hrs. 15 min.	—	—	—	194

The results showed that there was more sulphuretted hydrogen removed as the quantity of ammonia increased, although the amount of oxide was the same in all experiments. Evidently the excess of sulphuretted hydrogen was removed by chemical combination with the ammonia. Such facts are well known in practice, where ammonia is allowed to go forward from the washers into the purifiers, to prevent sulphuretted hydrogen from showing at the outlet of the system. This procedure is no doubt more often used in the winter time, when the makes are high and the purifiers become dirty too quickly.

Summary and Conclusions.

Beyond this, we must content ourselves with giving the author's summary and conclusions. The investigation was more of a preliminary character, and necessitates speaking with reserve. However, consideration of the facts established, he said, leads one to the following general conclusions:

The purifying materials available sometimes contain varying amounts of oxide of iron in a form unsuitable for the purification of coal gas. The oxide available is of such a nature that its reaction with sulphuretted hydrogen is slow. Revivification is also slow; and the products contain an appreciable amount of sulphur permanently combined with the oxide. Revivification *in situ* necessitates the presence of an excess of oxygen obtained by admitting air. The incombustible material in the gas is consequently increased.

The impurities in crude coal gas when carbonizing Maitland coals are less than those present in gas obtained from British coals.

Climatic conditions are unfavourable to the efficient removal of ammonia in the summer. Extra cooling arrangements for the gas and special cooling plant for the water are therefore desirable.

The chemical constitution of the oxide necessitates a reactive temperature of not less than 80° Fahr. Owing to slow sulphiding, the heat of formation of iron sulphide is not sufficient to maintain the desired temperature. The latter is therefore supplemented in practice by the heat of formation of ammonium salts. These salts reduce the purifying efficiency of the oxide, and also cause excessive back-pressure. Some of the ammonia will eventually escape into the distribution system, and give considerable trouble in the maintenance of fittings.

If large purifying area is provided—*i.e.*, more than about 7 c.ft. of oxide per 1000 c.ft. of gas made per 24 hours—the oxide has a tendency to retain cyanogen; and some of the oxide of iron is lost for purification purposes owing to the formation of prussian blue. The temperature of the purifying mass is also reduced, owing to radiation losses. The efficiency of the oxide for the removal of sulphuretted hydrogen is thereby lowered. A reaction temperature between 70° and 80° Fahr. is undoubtedly the secret of successful purification with oxide of iron. In practice, deficiencies in temperature have been automatically adjusted by the heat of formation of ammonium salts, such as sulphides, carbonates, and sulphates.

Apart from the inefficiency and the losses incurred by such a system, the practice is accompanied by back-pressure difficulties. The only alternative is therefore to heat the gas prior to entering the purifiers, or to heat the oxide.

A process specially suitable for local conditions is desirable. It may either be a modification of the existing process or an entirely new one. The most efficient, theoretically, is one using the sulphuretted hydrogen in the gas for the removal of ammonia, by the oxidation of the sulphuretted hydrogen into sulphuric acid, which then removes the ammonia. Several processes have been suggested—for instance, those of Feld and of Burkheiser. But for some reason or other, they have not up to the present reached the commercial stage.

ASSOCIATION OF NORWEGIAN GAS ENGINEERS.

A belated report of a congress of the Norwegian Association of Gas Engineers, held at the end of last year, is published by the "Journal des Usines à Gaz." Herr Schieldrop, the Manager of the Bergen Gas-Works, reviewed the work of the year, during which period four concessions had been granted by the Municipality of his town. At the present time there are in Norway ten municipal gas undertakings and six private concerns. The total production of gas in 1917 was 44,200,000 cb.m. (1554 million c.ft.), approximately the same as in the preceding year. But five gas-works had been compelled to suspend operations; and prices of gas had been very much increased. A question which occupied considerable discussion at the Congress was the remuneration of gas engineers. It was adopted that for all works making more than 400,000 cb.m. per annum the minimum salary should be £150 for assistant engineers and £600 for managers. A technical communication, the substance of which is not reported, concerned the carbonization of wood for gas making; and Herr Ekenaes, in giving an account of the Christiania Gas-Works, mentioned an experience which he had had in employing carbonic acid gas to prevent of the spontaneous combustion of a stock of 10,000 tons of coal before the temperature had reached 140° Fahr.

Gas from Wood and Peat.

The great shortage of coal in Switzerland (so it is stated in the "Journal des Usines à Gaz") is leading to the distillation of a very considerable tonnage of wood and peat for gas making, and to the development of a process suggested by M. Demolis for the more complete removal of the large proportion of carbon dioxide in gas produced by the distillation of these materials. The process consists in passing the raw gas over incandescent wood charcoal; the carbon dioxide being thus converted into carbon monoxide, while the acetic acid present in the gas is decomposed. It is stated that the tar from wood is likewise improved by the process, which is in experimental actual use at the present time in Switzerland, in works using vertical retorts. Swiss gas-makers are likewise seeking to organize means for the cutting of timber for gas making, and for the working of peat deposits. In some cases it is proposed to enrich the gas from these materials with acetylene.

Colour in Lighting.

A series of papers prepared for the "Correspondence Convention" of the Illuminating Engineering Society of America, and circulated among members, was entitled a "Colour Symposium." In the first of the papers, which dealt with the "Potentiality of Colour in Lighting," Mr. M. Luckiesh remarked that, in gleaning the knowledge of the expressiveness and impressiveness of colour from the many indirect and unassociated sources of information, it is easy to go astray, because of the many influences or factors to be considered. It is senseless to adopt a certain colour-effect for all occasions which, from a superficial view, appear similar, just because the result is satisfactory in one case. A few common examples were given to illustrate the use of coloured lights for their psycho-physiological effects. Red is characteristically a stimulant or excitant; while yellow and orange are mildly stimulative, and best described as warm colours. Tints and shades of yellow are the colours most widely used in interiors; and the colour of most early illuminants has been a warm unsaturated yellow. These influences have led to a desire to alter modern illuminants to a warm yellow colour. But a mistake is made in using amber for the purpose; for its hue is greenish-yellow, which is not generally pleasing for illumination. Green is most generally characterized as a neutral colour; and it has value for illuminating purposes in the more elaborate artistic schemes of lighting. Blue is a cold, sedate, and even depressing colour. The coldness of blue or blue-green is often undesirable; but proper tints of these colours may be utilized to advantage. In most of the applications of coloured illuminants for general lighting, tints that are felt but scarcely seen are more usually desirable than illuminants giving purer colours, although the latter have decorative value.

Utilizing Waste Heat from Coke.—There is described in "Prometheus" a process adopted by the Berlin Anhaltische Maschinenbau A. G., for utilizing waste heat from coke. The hot coke is run into a double-walled hopper; the space between the inner and outer walls being filled with water. The container is then closed, and steam is raised in the outer jacket, after which the coke is allowed to fall out at the bottom. In order that the coke should not cool too slowly, and in order that it may be cooled down as far as possible, cold gases are allowed to enter the column from the bottom; and these are drawn off heated at the top, and passed through a second steam-boiler, in which they produce steam, which is utilized together with the steam from the outer jacket of the coke-container. The gases that are passed through the coke must not contain any oxygen; and on this account the products of combustion of the coke that collect at the top of the boiler above the coke are used. The gases begin to blow through the coke when it is cooled down to about 500 to 600° C. by contact with the water-jacket; and the flow of gas is maintained until the coke reaches a temperature of about 100° C., at which only 0·1 p.ct. of the heat value of the coal is removed with the coke.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Scientific Burner Production.

SIR,—Would Mr. Gould supplement the information given in his letter (p. 501) by saying what test is applied to "the assembled burner" . . . "for general efficiency"?

CHARLES CARPENTER.

South Metropolitan Gas Company,
709, *Old Kent Road, S.E.*15, *June* 14, 1918.

SIR,—In the remarks made by Mr. Charles Carpenter, D.Sc., at the meeting of the Institution of Gas Engineers, I took same to mean that he wished to carry the onus of the discouragement for scientific burner production from the very fact that the sinner was the producer of gas, as well as the distributor of gas—*i.e.*, that no burner can be efficiently adjusted with any degree of certainty that it will give the satisfaction that he is desirous of obtaining until such time as we know from hour to hour what gas is expected to be pushed through the burner, and at what pressure it is to be pushed through.

So soon as we can arrive at this most desirable point, the manufacturers of burners will undoubtedly aim for that efficiency, by thorough testing, which is essential if we are to maintain gas lighting, as I hope we will.

W. D. HELPS.

10, *York Place, Leeds, June* 12, 1918.

Prepayment Consumers and Price Increases.—Mr. R. S. Ramsden writes that he will be pleased to learn whether any readers of the "JOURNAL," in towns comparable with Burton-upon-Trent, have had any success in collecting increases in prices of gas from prepayment consumers without altering the mechanism of the meters.

REGISTER OF PATENTS.

Rotary Pressure Blowers, Exhausters, &c.

No. 114,584.

LYON, F., of Bordesley Green, Birmingham.

No. 15,700; Oct. 29, 1917.

This invention relates to exhausters, pumps, and the like, with a hollow circular casing, within which is a drum or rotating member having its axis parallel to, but not on the same centre as, the axis of the casing. It carries blades or paddles (sometimes called pistons), which make contact at or near their outer edges with the internal walls of the casing; while the outside circumference of the drum usually touches, or revolves comparatively close to, the internal surface of the casing at one point of its periphery and the whole (or greater portion) of its length, but leaves a crescent-shaped space between the periphery of the drum and the internal circumference of the casing for the remainder of its circumference.

The claim made for the invention includes: The use of a disc-like plate which revolves within, and concentrically relatively to, the internal circumference of the static casing of the machine; the plate having a circular flange approximately equal in size internally with the internal diameter of the static casing, and forming a means of controlling the outer tips of the sliding blades in a true circle, and taking or containing the radial thrust or centrifugal pressure of the blades—consequently relieving the circumferential walls of the casing from such centrifugal pressure and the friction caused thereby. A suitable device is provided for the purpose of maintaining contact between the face of the disc-like plate and the end of the drum or rotating member of the machine.

Coin-Freed Mechanism for Gas-Meters.

No. 115,320.

SHAKESHAFT, C. E. M., of Witton, and CLARKSON, T. J. R., of Aston, Birmingham.

No. 8368; June 12, 1917.

This invention has reference to the coin-freed gas-meters wherein the coin when inserted closes a drum casing and forms a connection between a slit rotary arm or carrier, having an exterior turning handle capable of a limited rotary movement, and a crown and ratchet wheel on the actuating shaft—the arrangement being such that, on turning the handle, the carrier and the shaft are turned until the coin arrives at a stop, when it drops into a receptacle, and the arm is free to be turned back, but the wheel and main shaft are held by a pawl engaging with the ratchet wheel.

Fig. 1 is a front elevation of the coin-freed device; fig. 2 is a sectional plan of a portion of it; and fig. 3 is a part longitudinal sectional elevation.

In the stationary disc shown is the coin slot A. The drum casing contains the various parts, including a moving disc B and a crown ratchet wheel C, mounted on a short shaft coupled on to the actuating shaft D. E is a slit rotary arm or carrier at the back of the coin slot; and F is the external handle by which the moving disc is turned. The stationary disc is (as usual) pierced with a ring of holes, equally spaced and bearing numbers indicating the quantity of gas which will be delivered for the value of a coin, for which the meter is arranged. When the coin is inserted in the slot A it is between the sides of the slotted arm or carrier E and engages between two teeth of the crown wheel C. On turning the handle, the coin carrier and the actuating shaft together with the nut G of the supply valve controlling mechanism are rotated until the coin arrives at the stop H at the edge of an opening in the drum, when it drops into the money box below. The arm E with the moving disc are then free to be turned back; but the wheel C and the actuating shaft D are held by the pawl I engaging with one of the teeth of the ratchet wheel.

Fig.1.

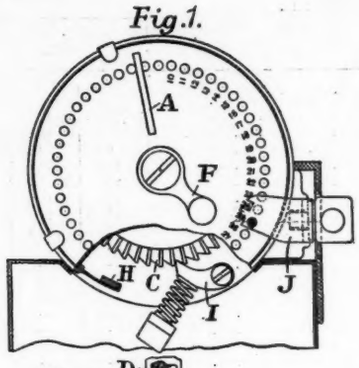
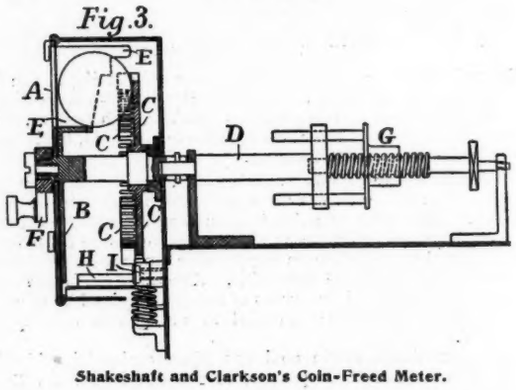


Fig.2.

Fig.3.



Shakeshaft and Clarkson's Coin-Freed Meter.

For varying the supply of gas allowed per coin the stationary disc is pierced with a number of holes arranged in a circle in its face, and some of these are numbered to indicate the number of feet of gas which the meter is set to deliver for one coin, which is effected by unlocking and turning the disc so as to set the coin slot and the arm or carrier at the required initial inclination.

In combination with these known parts of coin-freed mechanism there is a locking member J, which overlaps one portion of the edge of the stationary disc; and projecting on its inner face is a peg adapted to engage with any one of the holes in the disc. This locking member also has a finger and a notch at its outer end to indicate the position of the disc and the number of feet for which the disc is set.

Gas and Air (Under Pressure) Mixing Appliances.

No. 115,299.

CHILLINGTON TOOL COMPANY, LTD., and NETTLETON, L., of Wolverhampton.

No. 7145; May 18, 1917.

This invention relates to an appliance in which air and gas under pressure are caused to mix in a common chamber, forming therein a combustible mixture which passes to the place of consumption. It has for its object improved means whereby the proportions of gas and air which pass through the appliance may be altered without affecting the means by which the volume of mixture is regulated.

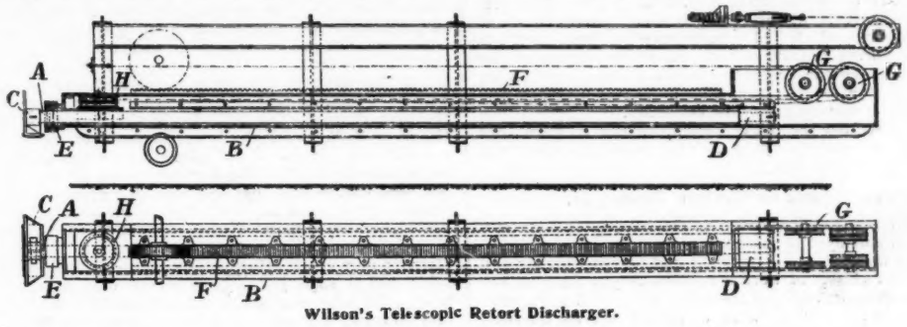
Broadly describing such an appliance, it is said to consist, as has been previously proposed, of two main portions—a casing and a hollow turning plug which is formed open at its inner end. The total volume of air and gas which passes into the plug and out through the inner end of it is regulated by turning the plug, and thereby altering the relation between the inlet openings formed through the wall of the casing for the inlet of air and gas respectively, and the corresponding openings formed through the wall of the plug for the inlet of air and gas into separate compartments of the plug, from which they issue into a mixing space. But means are provided by which the outflow from both compartments of the plug may be regulated, without substantially affecting the volume of air and gas which flows through the plug for any given position into which the plug may be turned.

Coke Discharger.—No. 115,742.

WILSON, W., of Falkirk, N.B.

No. 10,730; July 26, 1917.

This invention relates to telescopic coke dischargers for horizontal retorts, wherein the portion of the ram carrying the pushing head is



Wilson's Telescopic Retort Discharger.

movable within an outer portion deriving actuation through rack-and-pinion mechanism and containing flexible connections for imparting movement to the inner portion. The invention consists, broadly, in forming the outer portion of the ram as a water-box, so as to provide for water cooling.

The illustration shows a part elevation, part vertical section, and a part plan part horizontal section of the apparatus.

The discharger is mounted on a carriage in which it may be moved horizontally or vertically to suit the level of the retort from which the coke is to be discharged. It consists essentially of a telescopic ram, comprising an inner portion A and an outer portion B; the latter being preferably a solid shaft of circular section carrying a pushing head C at one end and at the other end a slide block D shaped so as to prevent relative angular displacement of the two portions of the ram. The outer portion of the ram is constructed as a box of rectangular section (in which is fitted the slide block) which is filled with water; the front end of the outer portion or water-box being closed by a stuffing box E through which the inner portion of the ram passes. On one side (preferably the upper side) of the water-box is a rack F meshing with a pinion by the rotation of which the box is caused to move along the slides on the carriage and into and out of the retort.

Within an extension at the end remote from the stuffing box E are mounted rope pulleys G, and also at the other end are rope pulleys H of a diameter equal to the full width of the box, and around which, and (if desired) also around guide pulleys on the carriage, are led steel ropes, each anchored at one end to the carriage and secured at the opposite end to the slide-block D—the arrangement being such as to ensure that the solid or inner portion of the ram is protruded from, or returned to, the position in the box at the same time as the box is moved forwardly or rearwardly on the carriage.

The construction is said to be such as to "ensure maximum durability and efficiency" of the discharger, and to permit "convenient access" to the ropes and pulleys—for example, when it is desired to change the ropes, without withdrawing the inner or solid portion of the ram or disturbing the stuffing box.

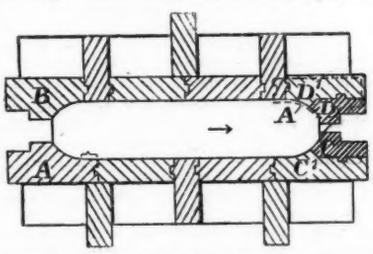
Vertical Retorts.—No. 115,738.

TOOGOOD, H. J., and ROBERT DEMPSTER & SONS, LTD., of Elland.

No. 10,283; July 16, 1917.

Defining their invention, the patentees say: In built-up vertical retorts tapering in both directions, when formed of rounded internal cross-section, the excessive number of shapes or moulds required to form the varying tapers and radii presents an economic difficulty in their construction. Rectangular cross-sections have therefore been used—the advantages of rounding the corners being sacrificed to economy of construction.

The object of this invention is to enable the rounded internal corners to be retained (or approximated) with a great reduction in the number of moulds or different sorts of special bricks required, by providing corner bricks having a mean and constant curved portion capable of



Toogood's (R. Dempster & Sons) Bricks for Vertical Retort Construction.

use over the whole or a large part of the retort, with straight portions or legs of varying length projecting beyond the curved portion. This construction allows, when built up in alternating reversed layers or courses, of proper substantial bonding and the formation of the end and side tapers.

To facilitate building, the corner bricks may be divided so that they will better bed to position, and made to interlock or break-joint in successive courses. The variation is economically obtained in the straight portions, which are adapted to conform to the decrease in the major and minor axes as the construction proceeds.

The illustration shows a sectional plan or layout of a portion of a retort.

The special corner bricks are lettered A, B, C, D; the bricks C D being preferably divided each into two portions C C^1 and D D^1 for the better bedding into position. Other brickwork of normal type is not indicated by any letters. The corner brick A is, in the building, superimposed on D; and by thus building alternate courses in reverse order, "excellent bonding is obtained throughout," and the diminution of the major and minor axes takes place as the construction proceeds by using successive bricks with shorter legs.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The British Gas Light Company (Norwich) Bill was read a third time, passed, and sent to the Commons.

HOUSE OF COMMONS.

Progress of Bills.

The Brighton and Hove General Gas Company have petitioned to be heard against the West Sussex County Council (Bridges) Bill.

The South Metropolitan Electric Light and Power Company, the West Kent Electric Company, and the Commissioners of Sewers have withdrawn their petitions against the South Suburban Gas Bill. The Woolwich Borough Council have also withdrawn their petition against the Bill.

The British Gas Light Company (Norwich) Bill was read the first time and referred to the Examiners.

Dirty Coal and Tonnage.

General CROFT (as intimated in the "JOURNAL" last week) asked the President of the Board of Trade how the estimated percentage of 5,000,000 tons of dirt at present included in the exported and coastwise coal was proposed to be dealt with by the Government; whether any official action had been taken to exclude the dirt; and whether his attention has been called to the meeting of the Southern District Association of Gas Engineers and Managers held recently, when they came to the conclusion that the coal could be properly cleaned and 5,000,000 tons of wasted tonnage due to the extra dirt contained in the coals might be saved.

Sir A. STANLEY, in replying, said that the Coal Controller was fully alive to the significance of the increased percentage of separable dirt in coal and was sparing no effort to decrease it. The importance of the matter had been impressed both upon the miners and the management of collieries by letter, and in some cases by addressing mass meetings. An officer of special experience has been appointed to make investigations at collieries with regard to specific complaints, and to consult both with the management and workmen regarding the steps to be taken to remedy the trouble. In so far as the percentage of separable dirt was affected by the cleaning and picking of the coal on the surface, the increase was partly due to the shortage of labour and machinery necessary for the purpose. He was not prepared to accept the figure of 5,000,000 tons as applicable either to the amount of dirt in exported coal or to wasted tonnage; and he was not aware of any reliable data upon which such an estimate could be based.

Gas-Works Bye-Products.

General CROFT asked the President of the Board of Trade whether, bearing in mind the fact that the bye-products obtained in the production of coal gas were necessary to the munition industries and as fertilizers, he would take steps to encourage the consumption of gas in the place of raw coal by householders, in order that gas-works might have first call upon all available coal supplies.

Sir A. STANLEY replied that the Board of Trade recognize the wisdom of this policy, and the Board's action was only limited by the amount of coal which could be got into gas-works by the transport facilities at present available.

The New Coal and Lighting Order.

Mr. WARDLE (the Parliamentary Secretary to the Board of Trade), in reply to a question by Mr. Rowlands, said it was hoped that it would be possible to issue the new Order with regard to coal and lighting this week.

Early Lighting of Street Lamps.

Mr. ROWLANDS asked the President of the Board of Trade whether his attention had been called to the early time at which the street lamps were lighted, and if he would consider the advisability of making representations to the local authorities with the object of having the

street lamps lit later, in order to effect a saving of power and to gain the full economic advantage of the Daylight Saving Act.

Mr. WARDLE replied that he was in communication with the Home Office in the matter.

Financial Hardships.

Colonel BURN asked the President of the Board of Trade if he proposed to sanction the attempt that was being made by gas companies to abrogate the sliding-scale which had been in practice since 1875, and by means of which, during a period of high prices, the increase of cost had been divided between the companies and the consumers, seeing that this change would enable the companies to pay an increased pre-war dividend entirely at the expense of the consumer.

Mr. WARDLE replied that the Select Committee had reported; but their report had not yet been made public. [The report has since been issued, and will be found on p. 544.]

Income-Tax Allowance for Workers' Clothes, &c.

Colonel THORNE asked the Chancellor of the Exchequer if he was aware that workmen employed as miners are allowed a rebate of £10 in the assessment of income-tax for the wear and tear of clothing and tools; that many other classes of workmen—such as gas workers and men in chemical factories and shipyards—suffered as much from wear and tear of clothing as miners; and if he would consider the question of giving a rebate to all classes of workers the nature of whose employment causes an unusual expenditure for clothing.

Mr. BONAR LAW, in reply, said that allowances were made to miners for tools and other expenses according to the circumstances of each pit. In regard to clothes, the Commissioners of Inland Revenue, after consultation with the Miners' Federation of Great Britain, had authorized an allowance from the quarterly income-tax assessments on miners at the rate of £4 or £5 per annum, according to circumstances, in respect of clothing used exclusively for the purposes of the miners' employment. Rates for similar allowances had been, and were being, agreed for other classes of workers with the principal trade unions concerned; and an allowance would be given in every case in which it could be shown that expense was incurred by manual workers for clothing used exclusively for the purposes of their employment.

Electric Power Supply Committee's Report.

Mr. JARDINE asked the President of the Board of Trade what action he proposed to take on the report of the Committee on Electric Power Supply.

Sir A. STANLEY replied that the report was receiving careful consideration. Issues of great importance were raised by the report; but no time would be lost in dealing with the matter.

Depreciation of Machinery.

During the debate on the Finance Bill last Thursday, an amendment was agreed to giving manufacturers a second appeal to Referees—the first being to the Commissioners of Inland Revenue—on questions relating to the depreciation of machinery, if the Referees were satisfied that the application was made by or on behalf of any considerable number of persons engaged in any class of trade or business. Another amendment agreed to extend the allowances granted in respect of the wear and tear of machinery to machinery temporarily out of use through circumstances attributable directly or indirectly to the war.

MISCELLANEOUS NEWS.

PRICE OF GAS IN NEW SOUTH WALES.

An Amending Act.

When addressing the shareholders at the last half-yearly meeting of the Australian Gas Light Company, Sydney, N.S.W., the Chairman (Mr. George Cohen) stated that an Act had been passed by the Legislative Assembly of New South Wales amending the Gas Act of 1912. Under the 1912 Act, the Company were entitled to have the standard price of gas increased in accordance with any increase in the cost of labour; but they were not entitled to have the standard price increased if the cost of coal, oil, freight, rates, and other expenses—which, of course, were beyond the control of the Company—increased above the cost when the Act was passed. Large increases had occurred in all these items; and the Amending Act allowed these increases to be taken into account. However, the Act provided that the increased costs must be proved to the satisfaction of a Supreme Court Judge. At the same time, the Government adopted the attitude that, if the gas companies wanted assistance, they must, in this time of war, when so many were suffering in various ways, be prepared to make some sacrifice in the interests of the public; and so they insisted that the standard rate of dividend on the "A" and "B" shares must be reduced from 10 to 8 p.ct. Though, however, the old Act provided for a 10 p.ct. dividend on the original and 7 p.ct. on the new capital, the standard price of gas was fixed too low to allow of these rates being paid. The main section of the Amending Act is as follows:

Section twenty of the Principal Act is amended by omitting from and inclusive of the first proviso down to the commencement of the second proviso, and inserting in lieu thereof the following: Provided that if at any time after Jan. 1, 1913, the cost of production and distribution of gas sold is increased above the average cost of production and distribution of gas sold during the year 1912, the gas company whose cost of production and distribution is so increased shall be entitled to have the standard price of its gas increased (by proclamation in manner hereinafter provided) by 1d. per 1000 c.ft. for every 1d. by which the cost of production and distribution per 1000 c.ft. of gas sold is increased as aforesaid. In ascertaining the amount by which the cost of production and distribution has been so increased, there shall be included all increases in wages, freight, coal, oil, rates, and other expenses which under this Act are properly chargeable to revenue, and such a sum as the Judge hereinafter mentioned may determine will ensure a reasonable return upon the moneys expended on buildings and manufacturing and distributing plant since Jan. 1, 1913. Upon the auditor of any gas company certifying to the Minister that the cost of production and distribution of the gas sold of such company has been increased as aforesaid to the extent of at least 1d. per 1000 c.ft., the Minister shall with all reasonable dispatch cause an inquiry (at which the Minister and the gas company may be represented) to be held by a Supreme Court Judge; and if such Judge shall certify that the cost of production and distribution has been so increased, the Governor shall, forthwith, by proclamation in the "Gazette," increase the standard price by 1d. per 1000 c.ft. in respect of every 1d. by which the said Judge shall certify that the cost of production and distribution per 1000 c.ft. of gas sold has been so increased; and such increased standard price shall be substituted for the standard price mentioned in Schedule 1. And further, provided that where the standard price has been increased as aforesaid with respect to any gas company, the Minister may cause a further inquiry to be held in the manner aforesaid; and if such Judge shall certify that such increased standard price, after providing for all expenses properly chargeable to revenue, and allowing a reasonable margin for contingencies, is in excess of the amount required to pay the standard rates of dividend authorized by this Act, then the Governor shall forthwith, by proclamation in the "Gazette," decrease the standard price in respect of the said company by 1d. per 1000 c.ft. for every 1d. by which the Judge shall certify such increased standard price to be in excess. No proclamation under either of the above provisos shall be made with respect to any company within six months after the date of the last of such proclamations affecting such company.

The new Act also provides for a reduction in the number of Directors from twelve to seven.

LONDON GAS CHARGES.

Position of the South Metropolitan Company.

Writing to the "Daily Telegraph" on the subject of the letter of Mr. A. L. Leon, the Chairman of the Public Control Committee of the London County Council [*ante*, p. 386], Mr. Charles Carpenter, D.Sc., as Chairman of the South Metropolitan Gas Company, says: In your issue of May 27, you gave currency to a statement above the signature of the Chairman of the Public Control Committee of the London County Council, the object of which can have been none other than to exercise an unfair influence upon the Select Committee of the House of Commons, with whom the financial position of gas undertakings was at the time *sub judice*. Judging by the recommendations of the Committee, those discreditable tactics would appear to have had some effect, as will be realized when it is stated that the investors who furnished the capital required by this undertaking over a period of thirty-eight years before the war, and on which the return has never reached 5 p.ct. per annum, will receive no relief until the interest on the money subscribed by them falls below 1¾ p.ct.

Whether by such treatment the same measure of justice has been meted out to capital as to labour, I leave your readers to judge. There is, however, a bright side to the picture—namely, that the Committee of this Company's workpeople, of the kind now usually called "Whitley," although it has been in existence over nine-and-twenty years, decided, and recently reaffirmed its decision, that the financial position of the undertaking was such that they did not feel justified in asking on behalf of its employees for the additional 12½ p.ct. upon their wages, which has been generally given in many flourishing (?) industries.

A Company which has been the pioneer in many matters of service to the State surely deserves more consideration in its time of trouble than that recommended by the Select Committee's report. As you gave publicity to Mr. Leon's statement while the terms of the report were under discussion, I would ask you to do the same for this letter now that the recommendations of the Committee have been presented to Parliament.

TRADING WITH THE ENEMY.

Report of the Committee.

A report to the President of the Board of Trade has been made by the Committee appointed to advise the Board on matters arising under the Trading with the Enemy Amendment Act, 1916. This Advisory Committee, whose Chairman is Mr. Ernest Moon, C.B., K.C., were appointed a little more than two years ago, at which time the Board of Trade had cognizance of over 500 cases which fell to be considered under the Act mentioned. Further cases were constantly coming along; and up to the date of their report, the Committee had held 139 sittings at which persons interested were heard, and 960 separate cases had been dealt with. Cases, though not in large numbers, are still being discovered and brought up for consideration.

Early in their work, the Committee became convinced that, in cases in which businesses formerly carried on mainly for the benefit, or under the control, of enemy subjects were useful and successful, it was more in the national interest to transform them into British businesses than to wind them up; and accordingly, after consulting the Custodian, they have on many occasions recommended that the enemy-subject interests should be vested in him, as the Custodian, for sale. In this way, a number of useful businesses are now carried on in British hands which were formerly largely or wholly under the control of enemy subjects. Cases in which enemy subjects have been resident in this country for a long period of years, and whose record was unimpeachable (but who have omitted to become naturalized), have been strongly pressed upon the Committee as instances in which exemption ought to be granted. But the Committee, in view of the mandatory provisions of the Act,

have not felt justified in recommending exemption on these grounds only, though they have felt sympathy with some of the persons affected. The Committee "have a strong suspicion that in many instances British nationality has been adopted purely as an armour of defence; and it is not at all improbable that the adoption of it has been made a condition of financial support. But such businesses are not within the jurisdiction of the Board of Trade either under section 1 or section 4. If, however, German trade penetration is to be fully dealt with, some of the cases in which it is carried on by recently naturalized Germans would seem to require consideration." As regards Hungarians, the Committee were informed that British businesses in Hungary were not being interfered with; but it was decided by the Board of Trade not to exempt Hungarian subjects upon the ground of nationality alone. It was, however, rarely found necessary to interfere with Hungarian businesses.

Naturally, a great variety of cases have been considered by the Committee, ranging in importance from the Siemens business with a capital employed of over £2,000,000, and the Badische Company, Ltd., with an annual sale of £354,000 worth of dyes, down to the smallest trading concerns. In fact, the variety of trades in which German subjects were engaged was a noticeable feature of the Committee's work. And they add the significant remark: "Whatever the business was, organization, adaptability, personal application, and in case of necessity ruthless competition, produced successful results; for in few of the numerous cases upon which the Committee advised was the business found to be unprofitable." Their inquiries demonstrated the necessity of the legislation for the registration of names; as "foreign traders have habitually substituted British names for their own for the purpose of misleading their customers into the belief that they were dealing with British principals, instead of aliens." The free choice of titles which joint-stock companies enjoyed also enabled foreign traders to conceal their nationality, and acquire whatever advantage may accrue to a business appearing to be a British one.

A schedule to the report contains a synopsis of the businesses which have been dealt with by the Committee. From this it is seen that four of the cases were in connection with coke-ovens; forty-one were electrical; and nineteen related to gas-lamps.

Coal Troubles at Glasgow.—Mr. Alexander Wilson, the General Manager of the Glasgow Corporation Gas Department, has reported to his Committee as to the difficulty in obtaining deliveries of coal for the gas-works. The stocks are at present exceptionally low. The Committee have authorized Bailie Drummond and Mr. Thomas Young, along with Mr. Wilson, to make representations to the Coal Controller and to the Ministry of Munitions, with the view of more regular and adequate supplies being made to the gas-works. It is proposed to erect at the Provan Gas-Works water-gas plant calculated to produce 2,500,000 c.ft. per day; and application is to be made to the Ministry of Munitions for the necessary permission.

GAS-WORKS RESULTS AT ROTHERHAM.

In his report to the Gas Committee on the working for the year ended March 31, Mr. J. S. Naylor, the Engineer and Manager of the Rotherham Corporation gas undertaking, says that the quantity of coal carbonized was 26,316 tons, at a cost of £24,627, or 18s. 8·60d. per ton, as against 23,644 tons last year, costing £19,550, or 16s. 6·44d. per ton. The gas made was 355,410,000 c.ft., as against 321,515,000 c.ft.; being an increase of 33,895,000 c.ft. The make per ton of coal carbonized was 13,505 c.ft., as against 13,598 c.ft. The quantity sold was 309,396,000 c.ft., as against 285,599,000 c.ft.—an increase of 23,797,000 c.ft., or 8·33 p.ct. The unaccounted-for gas was 11·93 p.ct., which compares with 10·27 p.ct.

An ample sum has been allowed for depreciation before arriving at the gross profit of £14,061, which is a decrease of £1647 on the preceding year. The net profit, after allowing for interest, redemption instalments, and contributions to sinking funds, amounts to £4189, as against £5883, or a decrease of £1694. If the gas for public lighting (£307) is again given by the department as in former years, there remains a surplus of £3882, subject to any excess profits duty or contribution to the relief of the rates.

BURTON-UPON-TRENT GAS ACCOUNTS.

The Borough Treasurer (Mr. Sidney E. Allen) has submitted to the Gas and Electricity Committee of Burton-upon-Trent the accounts relating to the gas undertaking for the twelve months to March 31 last. They show that the income (£84,785) was 9·2 p.ct. more than for the previous year, while the expenditure (£72,268) was 21·65 p.ct. more. There is a net surplus of £5802, compared with £11,781 in 1916-17.

An increase in income from the sales of gas of 7·9 p.ct. was accounted for mainly by higher prices charged during the second half of the year; the total consumption having been only 1·69 p.ct. more. For motor-cars, 25,600 c.ft. of gas was sold. There was realized for residuals £31,062, or an increase of £2901. Coal cost £4107 more; the average price having been nearly 20s. 6d. per ton. The bonus on profits is this year ½ p.ct. on salaries and wages, as against 3½ p.ct. last year. To transfer the whole of the £7000 voted in aid of the rates from the gas account would necessitate taking £1198 from the reserve fund.

The total sale of gas was 366 million c.ft., against 360 millions in 1916-17; the quantity unaccounted for having been 6·97 and 6·81 p.ct. respectively. The average price received was 2s. 9·27d. per 1000 c.ft., as compared with 2s. 7·27d. The average consumption per consumer, at 30,300 c.ft., was 200 c.ft. more than in the preceding year.

When presenting the Committee's report to the Town Council, Alder-

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SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

man Lowe intimated a further increase in the price of gas. Instead of the £7000 which it had been intended to contribute to the rates, it was proposed to vote £6000 from the gas undertaking, which would necessitate taking a small sum from the reserve. The Manager (Mr. R. S. Ramsden) was to be congratulated on the price he had obtained for his coke.

The £6000 to go to relieving the rates represents 4d. per 1000 c.ft. on the gas and about 6d. in the pound to the rates.

INCOME-TAX—DEPRECIATION ALLOWANCES.

A deputation from the Federation of British Industries waited on the Chancellor of the Exchequer on Monday last week to discuss certain points which had been raised in the House of Commons at the Committee stage of the Finance Bill in regard to depreciation allowances for income-tax purposes. Mr. Bonar Law received the representations most sympathetically, and promised to amend the section relating to appeals to the Board of Referees in such a manner that the interpretation of what constitutes a necessary number of persons in any class of trade to make a representative appeal on behalf of the trade will be left to the Board of Referees and not to the Commissioners of Inland Revenue as was originally proposed in the Bill. This amendment will obviate many difficulties which were anticipated by the Federation. Mr. Bonar Law explained that the sub-sections dealing with obsolescence of plant or machinery and depreciation of buildings, which had been inserted in the Bill in consequence of the arguments advanced by the Federation of British Industries last year for the first time give allowances which cannot be regarded as unsatisfactory. He further promised that a White Paper should be prepared by the Board of Inland Revenue clearly explaining the nature and intention of these new allowances, and that representatives of the Federation of British Industries should be allowed to co-operate in drawing up this document. The Deputation regarded the Chancellor's explanation as entirely acceptable; and no further action will consequently be taken by the Federation in regard to these sections of the present Finance Bill.

Sir Edward Goulding, M.P., was the principal speaker at a meet- the Urban District Council saying that about twenty Irish gas-works may have to close-down before long, owing to difficulty in maintaining of works by the Brentford Gas Company on Duke's Meadow, Chiswick.

The Harrogate Gas Company announce that from the quarter ending June 30 the following discounts will be allowed: On gas for lighting, cooking, or heating if less than 250,000 c.ft. is consumed in the quarter, 10 p.ct.; 12½ p.ct. if the consumption exceeds 250,000 c.ft.; 12½ p.ct. on gas consumed and separately registered for power purposes; and 5 p.ct. on supplies for motor vehicles. All the existing discount rates are cancelled.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 17.

The market for pitch continues to maintain its firm tone, and there is no change to record in the price. There is quite a considerable amount of inquiry for next season; and there are also buyers for prompt delivery. Solvent naphtha is steady at 3s. 10½d. to 4s. per gallon, net and naked. Creosote and other tar oils, also tar spirits, remain unchanged at the Government controlled prices. Sulphate of ammonia is in ready demand on the Government terms.

Tar Products in the Provinces.

June 17.

The average values for gas-works products during the week were: Gas-works coal tar, 27s. 6d. to 31s. 6d. Pitch, East Coast 25s. to 30s. per ton; West Coast—Manchester 25s. to 30s., Liverpool 25s. to 30s., Clyde 25s. to 30s., nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 3s. 9d. to 3s. 10d. Heavy naphtha, North, 2s. 9d. to 3s. 1d. Creosote, in bulk, North 4d. to 4¼d. Heavy oils, in bulk, North, 4¼d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 2s. 6d. to 2s. 9d. naked, nominal. Naphthalene salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Very little change has taken place in market conditions; so many products now being under control. Pitch prices are well maintained, and London still quotes 52s. 6d. to 55s. per ton. A working arrangement has been come to regarding prices on the East and West Coasts, which now quote a uniform rate of 30s. South Wales prices are 38s. to 42s. per ton. Tar is, of course, subject to permit for private trade; but a fair amount of business is passing (a recent transaction was for 8000 gallons at 4d. per gallon f.o.r. at Girvan). Carbolic acid shows a dull tendency; but creosote, benzol, and toluol are without change. Anthracene continues at 4¼d. to 6d. per unit; but no improvement is noted in aniline oil. Solvent naphtha is improving slightly in Provincial centres on an increasing demand. London remains stationary; and the market is awaiting some new scheme of restriction or control with a certain degree of anxiety. Heavy naphtha is unchanged, and will probably be included in any further restrictions. Naphthalenes are dull, and are likely to continue so in the absence of export orders owing to the shipping difficulties. Crudes are still about the same figures of £5 10s. to £12 10s. per ton. Refined also is rather nominal

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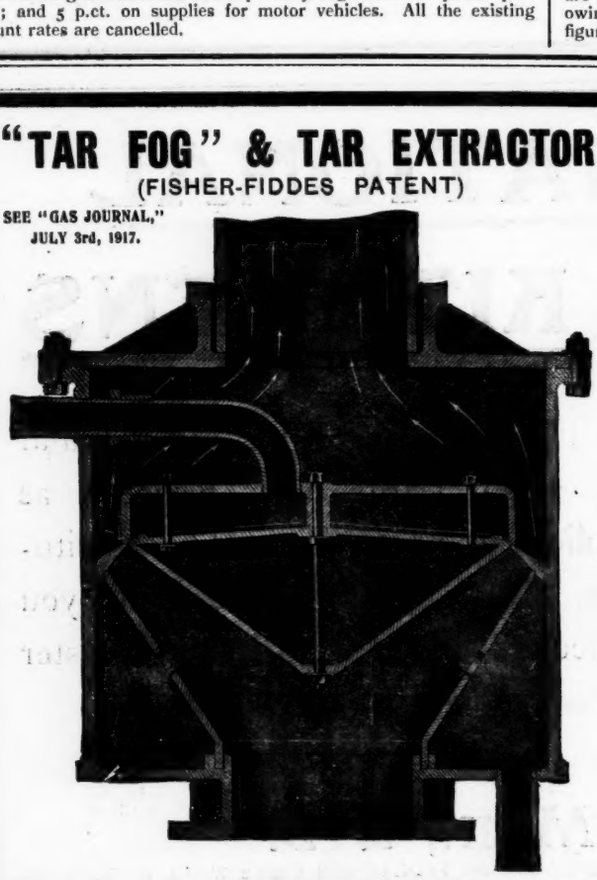

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at about £30 per ton. Cresylic acid has a tendency to improve. The range of quotations is as under:

Benzol: 90% London, 1s. 0¼d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. 6d. per gallon; crystals 40% 1s. 3d. per lb.

Crude Tar: London 32s. 6d. to 35s.; Midlands 27s. to 29s.; North 28s. to 30s. per ton, *ex* works.

Pitch: London 52s. to 55s. f.o.b. works; East Coast, 33s. f.o.b.; West Coast, 31s. f.a.s.; Manchester, 30s.; Clyde 29s.; South Wales 42s.

Solvent Naphtha: Naked London 90-190% 4s. 6d.; North 3s. 9d. to 4s. per gallon; 90-160% naked London 4s. 3d. to 4s. 6d.; North 4s. to 4s. 3d. per gallon.

Crude Naphtha: Naked 30% 8¼d. to 8½d.; North 6¼d. to 6½d.

Naphthalene: Refined £30 to £32 10s.; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4½d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4⅝d. per gallon); heavy oil, 4½d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

There is no news of any importance regarding this product. Makers are still interested in the synthetic ammonia process, but can obtain no particulars regarding costs, &c. Consequently, they are disinclined to make any capital outlay. Production under the ordinary methods is well maintained, and every effort is being made to increase output in order to satisfy the at present ever-increasing demand on agricultural and munitions accounts. The new season's price is £16 per ton to the agriculturist; the official price being £17 7s. 6d. per ton.

Manchester District Tar Prices.

The prices of tar, on the sliding-scale basis, in the Manchester district, for the months of March and April, were as follows: March, 35s. 1½d.; April, 36s. 1½d. The figures for May are not yet to hand.

Quality of Gas at Sheffield.—Referring to local gas affairs, the "Sheffield Daily Telegraph" says that the Gas Consumers' Association has been quietly but steadily organizing, and in many ways is making its influence felt. Lately there seems to have been some improvement in the gas supply, chiefly as regards pressure, though whether this is a permanent manifestation, or is merely a result of the smaller consumption normal during summer, only time will show. Some very large users of gas are a little anxious because their demands are likely to increase in the near future, and they are not quite sure what will happen when the winter comes along to increase consumption.

Limerick Gas Undertaking.

At a meeting of the Limerick Corporation, Alderman M'Neice observed that the Gas Committee did not seem to want to increase the price of gas in the city from 5s. to 6s. per 1000 c.ft., after all the trouble the Corporation had gone to in obtaining Parliamentary sanction for the scheme. The result would be a loss to revenue of £1000 a year. Mr. M. Griffin said they need not necessarily raise the price, as the Engineer now estimated a saving of £1600 or £1700 on the year's working, though he was up against a deficit of £2300. The idea appeared to prevail that they should get in a large amount of revenue, and that when they had £7000 the surplus should be handed to the rates. He hoped the Committee and the management would carry on the concern without increasing the price; but allocating any large sum for rates was another matter. Alderman M'Neice said the Chamber of Commerce were so strong in their opposition to the Provisional Order for power to raise the price, that they had prevailed on the Local Government Board for Ireland to insert a clause compelling the Corporation, as trustees of the gas-works, to create a reserve fund of £7000; and the Corporation had agreed to this. There was another clause whereby the Corporation were to get no money out of the gas-works until the price dropped to 4s. 6d.; but there was no chance of its falling. The consumers' representatives suggested that the price should not be advanced beyond 5s. There was a profit of £2800 before the war; and it behoved the Corporation to create a reserve fund. He thought it was obvious the Committee did not want to increase the price because they did not want to create a surplus—in other words, they did not want the Corporation to get anything. Mr. Griffin contended that the Committee did not know their position fully. They might yet have to close-down the works. It was a question of coal supply. Alderman M'Neice moved that the Council's representatives on the Gas Committee (which is a composite body) be instructed to take steps to charge a price that would wipe out the deficit of £2300. Ultimately, the matter was referred to the Gas Committee.

Newry Gas Prices.—The Newry Urban District Council Gas Committee have decided to raise the price of gas from 5s. 3d. to 5s. 9d. per 1000 c.ft. as from July 1. This is the third increase since the outbreak of war. For many years prior to 1913 (with the exception of a short period when the figure was 3s. 4d.), the price of gas in the town was 3s. 9d. per 1000 c.ft. The limit in the local Gas Act of 1871 is 7s. 6d.

Price of Gas at Walsall.—The Walsall Gas Committee have decided to raise the price of gas to all consumers in the borough and the outlying districts by 2d. per 1000 c.ft., as from the June reading. The charges will therefore be, in the borough and district: For manufacturing and power purposes, irrespective of quantity, at a flat rate of 2s. 9d. per 1000 c.ft. For lighting and domestic purposes 3s. 5d., less 2½ p.ct. discount for payments within one month. For slot meters, 3s. 8½d.

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The Year's Work at Arbroath.

Mr. A. C. Young, the Gas Manager at Arbroath, in his report for the twelve months ended May 15 states that the gas manufactured in the year amounted to 130,083,100 c.ft., an increase of 11,381,200 c.ft. when compared with the previous year. The quantity sold was 125,184,120 c.ft., an increase of 12,557,265 c.ft. The number of cookers, grillers, and boiling rings now fixed is 5616. Increases of wages to the employees, and other items which could not be estimated for when the price of gas was fixed last year, have put up the cost of manufacture by about £1300, which is equivalent to a charge of 2¾d. per 1000 c.ft. of gas. The net saving from the vertical retorts erected in 1913-14 was £2428, equal to 6d. per 1000 c.ft. of gas sold. The result of the year's working showed that there was approximately a balance at the credit of revenue account of £7825, which included a sum brought forward from last year. From this, £4407 had to be provided for annuities, interest on loans, sinking fund, &c., leaving a balance unapplied of £3418. The Gas Committee agreed that £500 be set aside to the retort repair reserve fund, and that £800 be carried to the suspense account, in order to further reduce the cost of the vertical retort bench, leaving a balance of profit of £2188 to be carried forward, or £226 greater than the sum taken forward last year. This financial result, they said, had been achieved largely owing to the results obtained from the coal used being better than was anticipated, and also partly because of the increased sale of gas which could not be estimated for at the beginning of the year. The gas charges are to remain at 2s. 11d. per 1000 c.ft. to ordinary consumers, 3s. 4d. to coin-meter consumers, and 2s. 6d. and 2s. 8d. for engines.

Price of Gas at Airdrie.—In view of an estimated deficit on the working of the gas undertaking, the Airdrie Gas Committee agreed to recommend the Town Council to increase the price of gas 4d. per 1000 c.ft. The Committee will further consider the matter when the accounts for the year ended May 15 last are completed and audited.

Street Lights for Smokers.—An experiment which would be welcomed in other places is stated to have been undertaken by the High Wycombe Corporation. In an endeavour to cope with the shortage of matches, they have, in certain well-frequented parts of the town, placed tin boxes containing pipe-lighting gas-jets for the convenience of smokers.

Military Service Order.—The new Order under the Military Service Act, 1918 (section 2), which cancels a large number of occupational exemptions from military service granted by Tribunals, has now been issued. The fact is emphasized that the Order is a withdrawal of certificates of exemption, and does not in any way affect protection certificates such as those issued under the Munitions Area Recruiting Scheme, Forms 3476 A, 3476 B, and 3476 W.M.V. It follows that no alteration is made by the Order in the current arrangements by which holders of protection certificates are rendered available for service.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 12.]

Nos. 9086—9474.

Allen, W. J.—"Gas heating-apparatus." No. 9251.
Brownlee, H.—"Gas-burner for lighting coal-fires." No. 9365.
Dinning, J. W.—"Gas-generators." No. 9153.
Edgar Zinc Company.—"Retort-charging machines." No. 9233.
Edwards, J.—"Gas-lighters." No. 9127.
Francart, H.—"Gas generators or producers." No. 9473.
Harger, J.—"Manufacturing fuel gases." No. 9186.
Helps, G.—See Harger. No. 9186.
Ionides, A. C.—"Furnace temperature regulation." No. 9284.
Jackson, W. J.—"Retort-charging machines." No. 9233.
Larsen, C. F.—"Gas-lighter." No. 9237.
Linder, S. E.—"Manufacture of sulphate of ammonia." Nos. 9128, 9129, 9130.
Pease, E. L.—"Manufacture of gas." No. 9353.
Richards, J. H.—See Dinning. No. 9153.
Soc. du Gaz de Paris.—"Portable oven." No. 9123.
Southgate, A. W.—"Bunsen gas-burners for lighting coal, &c., fires." No. 9097.
Willey, H. M.—"Lamps for lighting." No. 9196.
Wyld, W.—"Preparing dry gaseous ammonia." No. 9094.

The Drighlington and Gildersome Gas Company are further increasing the price for gas all round (gas-engines excepted) by 6d. per 1000 c.ft. as and from the readings of the meters for the June quarter.

The proprietor of the Carrick-on-Suir Gas-Works has written to the Urban District Council saying that about twenty Irish gas-works may have to close-down before long, owing to difficulty in maintaining the coal supply.

Application has been made to the Local Government Board by the Chesterfield Gas and Water Board for an Order under the Special Acts (Extension of Time) Act, 1915, to extend to June 29, 1919, the time limited by the Gas and Water Board's Act of 1911, as extended by Orders of the Local Government Board dated 1916 and 1917, for the compulsory purchase of lands in connection with the development of the undertaking.

The report of the James Keith and Blackman Company for the year ended March 31 states that, after providing for debenture interest, excess profits duty, and making sufficient allowance for depreciation and reserves against doubtful debts, the net profit amounted to £30,579; and £9052 was brought in, making £39,631. The Directors recommend a dividend on the ordinary shares at the rate of 10 p.ct. and a bonus of 5 p.ct., both free of tax. There will be transferred to reserve account £9267, leaving to carry forward £16,253.

MILES PLATTING,
MANCHESTER.

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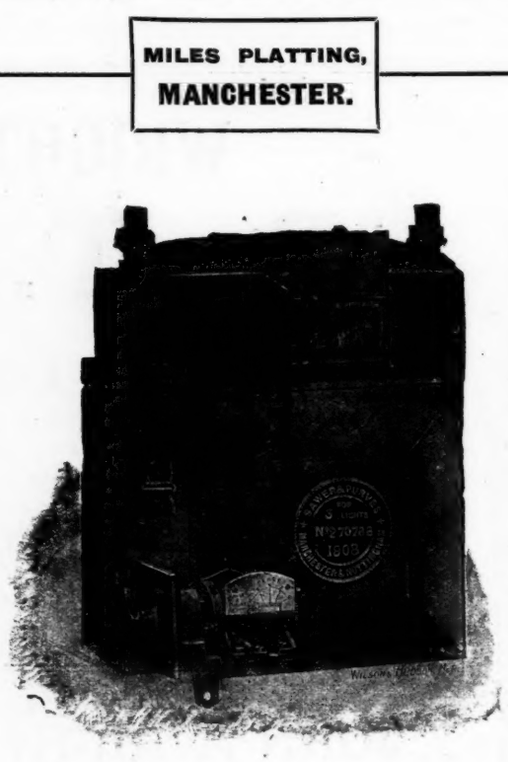
and
PURVES.
(BRANCH OF METERS, LTD.



PREPAYMENT
METERS.

RADFORD ROAD,
NOTTINGHAM.

AGENT FOR SCOTLAND
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2, Causeyside St.,
PAISLEY.

Gas Prices in Nottinghamshire.—Though situate in the midst of one of the richest coalfields in the Midlands, the Kirkby Urban District Council have found it necessary to raise the price for gas to 4s. 6d. per 1000 c.ft.; slot-meter consumers being charged at the rate of 1d. for 17 c.ft.

Price of Gas at Bradford.—At last Tuesday's meeting of the Bradford City Council, the proposal to increase the price of gas to all consumers, for whatever purpose, by 5d. per 1000 c.ft. was confirmed. The increase will commence after the meters have been read for the present half year.

Coal Supplies at Rochdale.—At the last meeting of the Rochdale Gas and Electricity Committee, it was reported that the difficulty of maintaining supplies of coal at the gas-works is increasing. At the beginning of the winter there was some 7000 tons in stock; a week ago, there was barely sufficient to maintain the immediate demands of gas making.

Ossett Gas Undertaking.—At the Ossett Town Council meeting last week, Alderman H. Robinson, the Chairman of the Gas Committee, announced that a deficiency of £1585 was to be expected on the current year's working of the undertaking. It was decided to confer with the Horbury Council with a view of increasing their gas charges from 4s. to 5s. per 1000 c.ft.

Coal Rations for Industries.—A conference is, "The Times" understands, to be held on the subject of the rationing of coal to industries.

Rates of Pay at Wolstanton.—The employees of the Wolstanton Gas-Works have been granted an increase in their wages, in the shape of war bonus, of 4s. per week, which makes a total war bonus of 16s., with the addition of 12½ p.ct., in accordance with the award of the Committee on Production. Mr. C. Loveridge (the Gas Engineer) has also been granted an increase of £50 a year.

Rationing of Non-Ferrous Material.—The Brassfounders Employers' Association, of Birmingham, have had placed in their hands the allocation of non-ferrous metals for the whole of the home and export trade of the country. An allotment of material is made by the Priority Sub-Committee to the Association, on the basis of the consumption between Aug. 1, 1915, and July 31, 1916; and about 50 tons of brass a month is dealt with. At least three times as much uncontrolled brass as controlled is to be used; so that between 300 and 400 tons of finished goods are represented by material supplied through the Association. The schedule of articles covered by the ration includes, under gas-fittings, main cocks, union cocks, union joints, stove fittings, nipples, and unions. For the home trade only articles of repair and renewal are provided for.

STOCK MARKET REPORT.

THE course of affairs on the Stock Exchange last week was just a continuation or a repetition of the general position and characteristics of the week before in almost every particular. There was the same demonstration of strength in pretty well all markets, from those of the highest quality down to those of humble rank. The war news, while devoid of operations on a scale of capital magnitude or importance, contained gratifying indications of gallant and successful engagements at many points. There was plenty of money eager to be invested if only the desired stock could be obtained.

The gilt-edged market exhibited all the strength which would now appear to be almost established as a normal condition. War Loans were in good demand, and finished up on Friday with a general advance. Consols and other Home Government issues also hardened, and Colonial and Indian were included in the general favour. Home Rails were very quiet; but where business could be done, the tendency was all upwards. Canadians continued to enjoy the demand prompted by anticipations of a happy issue to the Government programme. Argentines were irregular.

The Foreign Market was fairly good, but less enterprising. French had a turn of dulness at first, but recovered position later in the week. Spanish and Greek issues were inquired for. In the Miscellaneous group, there were several points of animation. Rubber was very uncertain; but Oil was a good market.

Business in the Gas Market did not show the slightest disposition towards an increase of activity, but rather the reverse. Even the three largest issues—Gas Light and Coke, South Metropolitan, and Imperial Continental—could not contribute a score of bargains between them all together, and many of the rest only threw in a single odd deal here and there. A prominent incident of the week was the issue of the report of the Statutory Prices Committee, the recommendations of which appear hard to reconcile with the considerations enunciated in the exordium.

The Money Market was fairly easy.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 63, 63¼, 63½, 64, Imperial Continental 87, Portsea "B" 81, 81½, Primitiva 30s. 6d., 32s., ditto preference 52s. 6d., 54s., Portsea 4 p.ct. debenture 66, 66½. On Tuesday, Brentford "B" 67, Gas Light ordinary 63¾, ditto debenture 56½, 56⅔, Imperial Continental 87, Primitiva 30s. 6d., ditto debenture 74½, 76, 76½, San Paulo preference 7⅞, Sheffield "A" 175, South Suburban 69. On Wednesday, Gas Light ordinary 63⅞, 64, ditto preference 69, 69½, Hastings and St. Leonards 46, Ilford debenture 64, Imperial Continental 87, Monte Video 8½, Primitiva preference 52s. 6d., ditto debenture 75½, 75¾, South Suburban 69½, Barnet 4 p.ct. debenture 64¾, 65¼. On Thursday, Brentford "B" 67½, Gas Light ordinary 63½, 63⅞, 64¼, Monte Video 8¼, Primitiva 30s., ditto preference 54s., ditto debenture 76, South Metropolitan 64½, 65¼. On Friday, Gas Light ordinary 62½, 63⅜, ditto maximum 53, Imperial Continental 87½, 87¾, Monte Video 8¾, Oriental 102, Primitiva 29s. 9d., 30s., South Suburban 69, 69¾, Sutton 5 p.ct. ordinary 70¾, 71.

The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	,,	April 8	2½	4⅝%	Alliance & Dublin Ord.	59—64	50—55	..
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	58—63	..
260,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5—5½*	..
50,000	10	Feb. 26	16	13⅓%	Bournemouth Gas and Water — 10 p.c.	20—30	21—28	..
383,110	10	,,	7	7%	Bournemouth Gas and Water — B 7 p.c.	15—15½	10½—11	..
115,000	10	,,	6	6/-	Bournemouth Gas and Water — Pref. 6 p.c.	13½—14	9—9½	..
159,740	—	—	—	4%	Bournemouth Gas and Water — 4 p.c. Deb.	..	67—69	..
992,045	Stk.	Feb. 26	14	4⅘%	Brentford A Consolid.	261—266	76—79	..
734,920	,,	,,	11	4⅓%	Do. B New	204—209	67—70	67—67½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	79—84	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—98	62—64*	..
217,380	,,	Feb. 26	11	9%	Brighton & Hove Orig.	208—218	135—140	..
344,200	,,	,,	8	6⅔%	Do. A Ord. Stk.	154—159	95—100	..
530,000	20	Mar. 26	12½	22/6	British	44—45	30—31	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	65—67	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	51—54	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	3½—4½	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—8	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	6%	Chester 5 p.c. Ord.	108—110	79—81	..
1,513,280	,,	Feb. 12	5/9/4	41/4	Commercial 4 p.c. Stk.	106—108	64—66	..
660,000	,,	,,	5½	66/8	Do. 3½ p.c. do.	103—105	62—64	..
475,000	,,	June 11	3	5%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53*	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	30—35	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	60—62	..
278,400	—	—	—	11½%	Croydon B and C 7 p.c.	..	150—160	..
—	—	—	—	10%	Do. B	..	..	..
492,270	Stk.	—	6	5⅓%	Derby Con. Stk.	123—125	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	7—8	..
16,398,975	Stk.	Feb. 10	4/17/4	37/4	Gas Light and Coke — 4 p.c. Ord.	98—102	62—64	62½—64½
2,600,000	,,	,,	3½	3½%	Gas Light and Coke — 3½ p.c. max.	76—79	53—55	53
1,062,235	,,	,,	4	4%	Gas Light and Coke — 4 p.c. Con. Pref.	96—99	68—70	69—69½
4,674,850	,,	June 11	3	3%	Gas Light and Coke — 3 p.c. Con. Deb.	72½—74½	54—56*	56½—66½
190,000	,,	,,	10	10%	Gas Light and Coke — 10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	3⅓%	Hastings & St. L. 3½ p.c.	87—89	46—51	46
70,000	10	April 29	11	9%	Hongkong & China, Ltd.	16½—16⅝	7—8	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	115—125	..
121,000	Stk.	Mar. 12	7½	7%	Ilford A and C.	151—154	90—96	..
65,780	,,	,,	6⅔	5½%	Do. B	115—118	70—75	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	93—94	63—66	64
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	86—89	87—87¾
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	65—68	..
235,242	,,	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	82—87	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. A & B	146—148	82—84	..
900,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4½—4⅝	3⅝—3¾	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	88—99	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8½—8⅞	8½ 8⅞
1,875,892	Stk.	July 29	4½	3⅓%	Newcastle&Gateh'd Con.	98½—99½	69—71	..
639,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—83	63—64	..
55,940	10	Feb. 26	7/14/0	7½%	North Middlesex 7 p.c.	14—15	9½—10½	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—123	101—103	102
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	2—3	..
60,000	50	Feb. 26	18	10%	Portsea, Island B	128—131	80—85	81—81½
100,000	50	,,	12	9%	Do. C	118—121	75—80	..
52,000	50	,,	10	7%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅝—1⅞	29.9—32/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4⅝—5	2⅜—2¾	52/6—54/-
531,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	76—77	74½—76½
—	—	—	—	4%	Do. ,, ,, 1911	..	..	..
346,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	57—63	..
150,000	10	May 14	6	6/-	San Paulo 6 p.c. Pref.	10½—11	7⅛—7⅜	7⅛
125,000	50	July 1	5	5%	San Paulo 5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	228—234	171—177	175
309,984	,,	,,	10	10%	Do. B	229—234		
628,800	,,	,,	10	10%	Do. C	220—222		..
90,000	10	May 28	9	6/-	South African	10½—11½	9—10	..
6,609,895	Stk.	Feb. 10	5/4/0	40/-	South Met. 4 p.c. Ord.	111—113	64—66	64½—65½
—	—	—	—	—	Do. Pref.	..	93—95	..
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	54—56	..
224,820	,,	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	124—126	..
952,795	,,	,,	6	4½%	S'th Suburb'n Ord. 5 p.c.	114—116	69—72	69—69¾
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	73—75	..
135,000	—	—	—	4½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	84—86	..
647,740	,,	May 14	5	3⅝%	Southampton Ord.	99—102	74—76	..
120,000	,,	Feb. 12	7½	5½%	Tottenham District — A 5 p.c.	185—188	90—95	..
782,275	,,	,,	6	4%	Tottenham District — B 3½ p.c.	115—117	67—69	..
181,255	,,	June 26	4	4%	Tottenham District — 4 p.c. Deb.	87—89	61—68*	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109½	87—88	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 26	8⅔	67/6	Wandsworth A 5 p.c.	151—156	108—118	..
255,636	,,	,,	6⅞	52/6	Do. B 3½ p.c.	129—134	80—85	..
108,075	,,	,,	5/17/8	47/8	Do. C 3½ p.c.	110—115	80—85	..
352,000	,,	,,	6⅛	46/8	Wimbledon 5 p.c.	117—122	80—85	..
98,000	,,	,,	6⅞	52/6	Epsom 5 p.c.	121—126	80—85	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	42—52	..

* Ex Div.

Reported Natural Gas Discovery.—According to the "Manchester Dispatch," importance is attached to a discovery of natural gas which has been made near Huddersfield. While workmen were boring for water, a vapour was seen to rise from the hole, and, becoming ignited, there was a burst of flame to a height of 30 ft. The gas burned for 24 hours before it could be extinguished. It has been successfully tried on a motor car; and other experiments with it are being made at the present time.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Research Chemist. Leeds University.
Technical Assistant. Nelson Gas Department. Applications by June 25.
Manager and Collector (Water-Works). "X. Y. Z.," c/o Brown's, Tothill Street, Westminster.
Junior Assistant Chemist. No. 6457.
Bricklayers. Sheffield Gas-Works.
Stoker. Boxhill Water and Gas Company.

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Plant, &c. (Second-Hand), Wanted.

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Plant, &c. (Second Hand) for Sale.

Purifiers, Valves, Connections, Travelling Cranes, Ironwork, &c. Bolton Gas Department. Tenders by July 11.
Washer. Leek Lighting Committee. Tenders by June 25.

TENDERS FOR

Coal.

Clitheroe Gas Department. Tenders by June 29.
Haworth Urban District Council. Tenders by June 24.
Leek Lighting Committee. Tenders by June 25.
Newark Gas Company. Tenders by June 28.

Tar and Liquor.

Leek Lighting Committee. Tenders by June 25.
Reading Gas Company. Tenders by June 24.
Worksop Gas Company. Tenders by June 24.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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Salary, £300 per Annum.
Applications will be received up to July 8 by the Secretary, The University, Leeds, from whom further Particulars may be obtained.

BOROUGH OF NELSON
(Gas Department).

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Applications, stating Age, and giving Full Particulars of Training and Experience, to be lodged with the undersigned not later than the 25th inst.
Dugald Currie,
Engineer and Manager.

WANTED—Local Manager and Collector for Water-Works Company. The Applicant must be prepared to give his entire Services and be Experienced in Main and Service Laying, able to Manage and Control the local Staff and arrange all Details for Working the Company's Plant, also Supervise the Collection of Water-Rates, &c., and have a fair knowledge of Book-Keeping. Must be Ineligible for Military Service.
Write, stating Age, Salary required, Experience, and References, to "X. Y. Z.," c/o Brown's, 39, Tothill Street, Westminster.